

EDITORIAL

Accessory Sales

GRADUALLY the opposition of car manufacturers to the sale of accessories by their dealers is waning. Within the last year one or two prominent makers have recommended that their dealers take on equipment lines to stabilize their sales volume during periods of slack car sales.

Recent figures compiled by the Motor & Accessory Manufacturers' Association show that accessory sales to the trade in June this year were 172 per cent of January as compared with 173 per cent in May. Retail sales of passenger cars for June were nearly 10 per cent less than in May, while car production fell off to an equal degree. In other words, equipment sales held even in June, while the usual summer decline in vehicle sales was taking place.

Dealers who have built up an established business in automotive equipment are in a far better position to become stable, permanent merchants than are those who rely entirely on car profits for their livelihood. They are better able to finance cars because of accessory profits—and they are highly desirable members for any dealer organization.

Superchargers

THE Indianapolis race each year creates a great deal of interest in the features of the participating machines, and more particularly in those of the winning car. This year the feature which stood out most prominently was the supercharger, and if anybody had such a device available that could be readily fitted to a considerable number of existing car models he could do a great deal of business among the young and sportily inclined.

Unfortunately, the proposition is beset with many difficulties. The manufacture of the blower itself, if of the centrifugal type, is a problem of no mean magnitude. In order to be efficient, the peripheral speed must be so high that the centrifugal force on the material near the circumference of the rotor is not far below 100,000 lb. per pound. Careful selection and distribution of material is therefore essential if the rotor is not to go to pieces in service.

The drive also involves serious difficulties. A member revolving at these enormous speeds has stored up in it a great deal of kinetic energy, and any sudden variations in speed result in high stresses in the drive. Some kind of friction clutch would seem to be necessary, the same as is used with all gear-driven radiator fans. If no such safety device is provided then the driving gears must be given a comparatively high factor of safety.

The reactions to the driving force come on the housing of the blower and it is therefore obvious that the latter must have a secure mounting. Now, where

the mounting and the drive have to be designed so as to be readily applicable to a variety of engines it is exceedingly difficult to meet these requirements. Of course, some super-charging can be accomplished at lower speeds of the rotor, and if anybody should attempt to build a so-called "universal" supercharger he probably would have to content himself with a rather moderate supercharging effect.

Federal Aid

THE anti-Federal Aidists are continuing their propaganda, probably with the hope of influencing action during the next session of Congress. As pointed out in AUTOMOTIVE INDUSTRIES several months ago, activities in opposition to Federal Aid are to be expected in the future. While there is little need to fear successful opposition to this highly valuable public asset, it would be a mistake for those who recognize the value of Federal Aid to fail to recognize the presence of unfavorable sentiment.

Governor Ritchie of Maryland recently made a direct attack on Federal Aid, using as a basis for his opposition many of the arguments which have been met and discounted on numerous occasions in the past. He pointed out, for instance, that Nevada receives in Federal Aid 216 per cent of the funds paid into the Federal treasury by the State. But he failed to note, as pointed out by a recent truck service bulletin of the A. A. A., that "approximately 90 per cent of Nevada is Government-owned land and that the benefit from the highways of the State is enjoyed mostly by tourists from all over the country, a great majority of them coming from the East."

Federal Aid acts as a great advisory check on road activities throughout the country, helping to insure expenditure of all road funds on roads which will be of economic value to the various communities and to the country at large. It is a tremendously valuable factor in the building and maintenance of a sound, useful highway system. Interference with its continuance would be most unfortunate for the people of the country and for the automotive industry.

Drivers and Accidents

OUT of 4073 drivers involved in automobile accidents in New York State during the month of May, 93 per cent had been operating motor vehicles for two years or more. About 82 per cent of those involved in fatal accidents had been driving for two years or more.

Examination of drivers eliminates from the ranks of vehicle operators those totally unfit or unskilled in running automobiles, but it has far less bearing on motor vehicle accidents than a good many state legislators seem inclined to believe.

Our Industry Today

Although Production Is at Low Ebb, Due to Seasonal Reductions, Demand Continues Heavy, with New Sales Records

NEW YORK, July 22—Production of motor vehicles is at a low ebb for the year, due to seasonal closing down of plants for vacations, inventories, and preparations for new models. Demand, however, is unusually active for this time of year, and several factories have maintained output at capacity. In two or three outstanding instances there have been announcements of plans for expansion of productive facilities.

In all lines of automotive production and sales the first six months of 1925 established new records, the parts, accessory and service equipment manufacturers participating with the car and truck producers in the general prosperity. This has inspired a feeling of optimism and any unusual slump in summer sales would come as a distinct surprise.

With business as a whole in good condition, and with the public showing a keen interest in the new cars and models recently announced, there is ground for the hope that the remainder of the year will be satisfactory to the automobile and allied industries. But so far as July is concerned, the single fact that Ford has considerably curtailed operations would account for a large decline in the production total.

An outstanding feature of the automotive industry so far this year is the great earning power it has displayed. Financial statements covering the first six months of business evidence an extremely healthy condition. This is due in a large measure to the fact that the producing companies have kept their manufacturing geared closely to demands, thus keeping finished stock and inventories lower possibly than ever before.

Expect Buying Activity

Fresh buying activity is expected to develop with the coming, beginning this week, of new models. Nash and Oakland are bringing out new lines and Chrysler is announcing important changes in the six-cylinder model.

Along with the new models will come some price reductions. In discussing prices it is interesting to note that practically all manufacturers have reduced the cost of their cars since January, the cuts in some instances amounting to as much as \$800 on higher class jobs, but despite these reductions profits have never been more satisfactory.

Makers of commercial vehicles, trucks and buses report an unusual volume of business. Buses especially are selling far in advance of a year ago. Accessory and specialty manufacturers are working at capacity to keep pace with the demand.

Sales continue heavy and many in the industry predict that business for the last six months of 1925 will prove as good as if not better than during the first six months.

July production is not expected to equal that of June, since several manufacturers, including Ford, are operating on part time during inventories, but there is as yet no definite indication that sales are slackening. Demand remains so firm that many companies are compelled to operate at capacity to catch up with unfilled orders. Financial statements for the first six months show an extremely healthy condition.

G. M. Sales Are Heavy

DETROIT, July 22—Sales of General Motors Corp. passenger cars and trucks to ultimate consumers during June totaled 75,781, 10,557 more than for June, 1924. The sale of passenger cars and trucks to dealers by the manufacturing divisions of General Motors during the past month totaled 70,974 as compared to 32,984 a year ago.

Following is the tabulation which shows monthly sales of General Motors cars to ultimate consumers and sales by the manufacturing divisions to their dealers.

	Dealers			Division		
	Sales to Users		Sales to Dealers	1925	1924	1923
Jan.	25,593	33,574	31,437	30,642	61,398	49,162
Feb.	39,579	50,007	33,627	49,416	78,666	55,427
March	70,594	57,205	74,632	75,527	75,484	71,669
April	97,242	89,583	105,778	85,583	58,600	75,822
May	87,448	84,715	90,327	77,223	45,965	75,393
June	*75,781	65,224	75,423	*70,974	32,984	69,708

*These preliminary figures include passenger car and truck sales in the United States, Canada, and overseas by the Chevrolet, Oldsmobile, Oakland, Buick, Cadillac and GMC Truck Manufacturing divisions of General Motors.

Ajax Co. Working Again

TRENTON, N. J., July 21.—The plant of the Ajax Rubber Co., Inc., which was tied up by strike for several days, is operating again with a small force of tire makers. One hundred and twenty tire makers.

Hupp Establishes Record

DETROIT, July 20.—Sales of passenger cars by the Hupp Motor Car Corp. for the second quarter were 45.6 per cent greater than for the same period last year, according to O. C. Hutchinson, general sales manager. Export sales were 100 per cent greater and the sales volume in dollars slightly more than 45.6 per cent.

June was the largest month in the company's history as regards sales volume in dollars, as shown by comparative figures in the company's report. June, 1924, shipments were exceeded by 92 per cent.

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**BRITISH CONSUMERS
OPPOSE RESTRICTIONS**

LONDON, July 17 (*by mail*)—British rubber consumers are opposed to the government's restriction of rubber production in the Malay Peninsula. The India Rubber Manufacturers' Association has issued a manifesto protesting against restriction charging that it is responsible for high prices and is liable to cause dangerous world's shortage.

"We state deliberately," says the manifesto, "that, given the present rate of consumption and calculating on only 10 per cent releases, under the restriction scheme the world's stock of rubber will be totally inadequate. We are rapidly approaching a condition of dangerous shortage."

The manifesto calls attention to the fact that the government is supposed to oppose the creation of rings and combinations, yet "here we have a case of artificial control of the supply of a basic raw material operating directly under the aegis of a government department, with resultant high prices to the consumer."

**Gardner Protests Against
Automobile Taxes in U. S.**

St. Louis, Mo., July 21—The time has arrived to remove the tax from the automobile, in the opinion of Russell E. Gardner, Jr., president of Gardner Motor Co., Inc. In a signed statement he says:

It is assumed that tax reductions amounting to some three hundred million dollars will be made at the next session of Congress. But as yet there has been no indication that this reduction will be extended to include automobiles. The inequity of all war levies has already been recognized by partial repeals, and it certainly seems unfair to tax any one group.

Automobile taxes are taxes on transportation. Other Federal taxes on transportation have been removed. The automotive industry now pays all the taxes other industries pay, and in addition must shoulder the burden of a special wartime sales tax.

FORD BALLOONS INCREASE

DETROIT, July 22—Since the middle of February, when the Ford Motor Co. announced that it would provide balloon tires as optional equipment on all new Ford cars until the end of May, the demand for these tires by Ford buyers has increased 40 per cent.

Since February the demand for balloon tires among new Ford buyers has increased until at the end of May 60 per cent of the cars turned out by the Ford company were balloon equipped to meet the demand.

**Rubber Soars As Manufacturers
Appeal To State Department**

**Tire Prices Advance From Ten to Fifteen Per Cent,
With American Buyers of Raws Seeking Gov-
ernment Action on British Restriction**

NEW YORK, July 23.—With a general advance in tire prices of from ten to fifteen per cent moving all along the line, the rubber Association of America has presented its case to the State Department at Washington and is awaiting definite action.

A. L. Viles, secretary and general manager of the Association, back from Washington with a delegation of rubber manufacturers, explained that the State Department is unable to protest against the activities of the alleged British combine of rubber producers, because British buyers are compelled to pay the same price for crude rubber as Americans.

"Where there is no discrimination, the state department cannot enter a protest," said Mr. Viles. "Naturally, we couldn't either. But anybody may ask the state department to convey information to another government."

Beyond the intimation that the rubber association had proposed some official action, Mr. Viles declined to discuss the contents of a lengthy memorandum which the delegation presented to the state department.

Find No Discrimination

Those who appeared before Secretary of State Kellogg to describe the difficulties facing the American rubber industry as a result of the rise in the price of crude rubber from 36 cents to \$1.18 a pound, were: Frederick C. Hood, president of the Hood Rubber Co., Edward B. German, president of the Dunlop Tire and Rubber Co., and Mr. Viles.

It is admitted by the American manufacturers that while the Stevenson re-restriction act has decreased the supply of crude rubber on the market, unquestionably having its effect on the price, there is no technical discrimination against American consumers because the British pay the rates.

Will Export 75 Per Cent

Experts are watching the market with interest for the effect of the 10 per cent increase in rubber exports from English colonies affected by the so-called "combine," which is expected to occur on August 1. Under the regulations of the combination, 65 per cent of the standard production of member producers is authorized for export. The 10 per cent increase will send 75 per cent of the production on the market.

It is also taken into consideration that the heavy demand for rubber has been a potent factor in advancing the price. June imports into the United States were 42 per cent greater than in June of 1924, in spite of the steady advance in price. Imports for the first six months of 1925 were 18 per cent in excess of the same period last year.

Philippine Rubber Plan

MANILA, July 21—The Bureau of Forestry has prepared a bill for the next Legislature providing for leasing of approximately 125,000 acres of land in Cotabato province, where success in growing rubber has been demonstrated.

Few 1925 Models Left on Automobile Market

Continued Buying and Common Sense Production Keep Sales Floors Cleared

DETROIT, July 22.—At a time when dealers' stocks of old style models ordinarily are plentiful, especially when certain manufacturers are planning on bringing out new models, this year finds the situation exactly the opposite.

In fact, certain larger car manufacturers find that the stock of the 1925 models which will be the old models in the near future are down to bedrock and that this situation is the best in years. Few if any are to be found in the dealers' showrooms. This conditions does not apply to any certain locality but is apparently nationwide.

Buying Continues Steady

Trying to find the reason for this is extremely hard. Most of the manufacturers attribute it to the continued buying, which, except for a slight seasonal decline, has not dropped to any great extent. One reason, perhaps, is that the late spring in certain sections of the country has caused the buying demand to continue. Another is that greater prosperity exists throughout the United States than for the past few years and the third is that the manufacturers have used good common sense in gaging their production.

Buying Is Not Deferred

Despite the knowledge of certain of the motoring public, that new models will appear presently, one of the leading automotive executives said that this fact was not deterring them from making purchases. They, the buying public, realize, he said, that the new models will not differ greatly from the old ones, and that the value they will get for their money will not be greatly different. This coupled with their desire to own a car has led to the stock of 1925 models in the field to be exceedingly low at this time.

Build Garage Solely for Bus and Truck Use

BOSTON, July 21—Ground has been broken in Boston for what will be the first garage erected here for the sole use of busses and trucks. It will be located in the business district on Albany street just on the edge of the big retail department store section on one hand and the waterfront and railroad terminals on the other. It is planned to accommodate operators of busses operating between Boston and out of town places and also trucks used in long hauls. At present the big increase in buss operation has been such that it

is difficult to house them. The new garage will accommodate 400 busses and trucks.

Among the features will be the partitioning of sections to be assigned to fleet owners, and the construction of special repair rooms. There will be lockers and shower baths for drivers and helpers. The owners are T. J. Moynahan, Jr., and Albert Erlandson. Mr. Moynahan operates a fleet of trucks used in the distribution of newspapers and Mr. Erlandson is an experienced garage man.

California Men Start Aerial Express Line

LOS ANGELES, July 21—The newly organized Western Air Express, Inc., whose papers of incorporation were filed recently with the secretary of state, plans to give California and the entire Pacific Coast a private mail and express service to rival that inaugurated by Henry Ford between Detroit and Chicago. The new company, which has for its directors and stockholders some of the most influential men of Southern California, promises to bid for government air-mail contracts on the Pacific Coast.

"Our first object," said Robert J. Morton, Los Angeles attorney and director of the company, "will be to reduce the air-mail time between Salt Lake City and Los Angeles from four to six hours. This will cut the time from New York eighteen hours.

No Stock for Sale

"Later we propose to establish air-mail service between San Diego and Seattle, via Los Angeles and San Francisco. A service of three and one-half hours can be established between Los Angeles and San Francisco, which will prove a wonderful asset to the business interests of the two largest cities of California.

The company has no stock for sale, the subscribers being California business men and eastern capitalists.

The Western Air Express, Inc., will use all-metal monoplanes like those used by Ford in his air and express service. The machines will be capable of great speed and altitude and can carry a ton of mail, freight or express.

Studebaker Export Sales Establish New Records

SOUTH BEND, July 21—Studebaker Corp. of America reports export sales have established new records every month since last October. In Canada alone the sales for the first six months of 1925 exceed export sales for the entire year of 1924. The increase for the past nine months is 60 per cent over that for any similar period in the corporation's history.

It is estimated that the July gain will amount to 76.6 per cent.

Gas Electric Rail Cars Ordered by Railroads

Pennsylvania and N. Y. W. & O. Expect to Make Track Tests Before August 1

PHILADELPHIA, July 23—With the completion of the new type Brill-Westernhouse gas-electric rail car for the Reading Co. within a few weeks, contracts for three of the same type cars have been placed by the Pennsylvania Railroad Co., while the New York, Western & Ontario Railroad has ordered one. It is expected that track and service tests will be made before Aug. 1.

All the cars will be of the same design. Each will have a generator of 160-kw. capacity connected to two 140 hp., 600-volt railway motors, mounted on the forward truck. The engine, directly connected to the generator, is a six-cylinder heavy duty type developing 250-hp. at 1100 r.p.m.

Engine Design by Brill Co.

This engine is of a design by the Brill Co. which is building the cars and trucks. The gasoline engines are being built at the South Philadelphia Works, Westinghouse Electric & Manufacturing Co., which is also furnishing electrical equipment and controls.

With an average load, the car will weigh 82,000 lb., with a speed of sixty miles an hour as a single unit. With a different gear ratio, however, the car will be able to pull a 150,000-lb. trailing load at 32 miles an hour.

Each car will be sixty feet long, with three compartments, the chief of which will be the passenger compartment, seating fifty. Each car will be arranged for double end operation.

De Paolo Repeats Speed Record on Laurel Track

LAUREL, MD., July 23.—Peter de Paolo, winner last week of the inaugural racing classic of the Washington-Baltimore Speedway at Laurel, Md., this week equaled his own world record made at Culver City, Cal., of 135.5 miles per hour, made on a circular track. His time for the 10-mile grind was 4 minutes 25 2/5 seconds. Twice during the eight laps which he made around the saucer he went as high as 137.8 miles per hour, but that does not determine the world record.

De Paolo did not use all four disk wheels but took the two front one off, because the wind interfered with his steering. The rear wheels were disk.

The track at Culver City is a circular mile and a quarter and banked at 45 degrees. The one at Laurel is one and one-eighth miles long and is banked at 48 degrees.

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Plan Reorganization of Hydraulic Steel Co.

Creditors Would Receive Pro-Rata Cash, Five-Year Notes Equal to Claims

CLEVELAND, July 22.—A reorganization plan is being submitted to stockholders and creditors of the Hydraulic Pressed Steel Co., for the purpose of placing that organization back on its feet. Under the plan creditors would receive pro-rata cash, five-year notes equal in face amount to the balance of the claims, together with one share of common stock for each \$100 original amount of claim.

Preferred stockholders would receive one share of common stock for each share of preferred stock of the Hydraulic Steel Co. held, and should be given the right to subscribe to additional common stock at \$10 per share. Stockholders shall have 30 days to subscribe to additional stock from the time the subscription offer is made. The common stock equity is wiped out under the plan.

Employees Would Purchase

The reorganization committee would petition the court for the sale of the property of the company from the receiver and would purchase the same.

It has developed that employees of the west side plant of the company in this city want to purchase it. The employees are headed by H. W. Kranz and associates, all of whom have been managing executives. They would form an Ohio corporation capitalized with \$500,000 of first mortgage 10 year six per cent bonds, 25,000 shares of 7 per cent cumulative preferred, of which 15,000 shares would be issued and 100,000 shares of no par common. They would pay \$250,000 in cash plus \$160,000 in settlement of adjustments, \$1,500,000 in preferred stock, and 45,000 shares of no par common and will agree to pay \$50,000 in cash for the balance of the 55,000 shares.

The reorganization committee has not had an offer for the East side plant of Hydraulic, but it has planned a corporation with \$500,000 of ten year 6 per cent bonds; \$2,500,000 of 7 per cent preferred stock. The holding company to have a capital of \$3,000,000 five year secured gold notes and 100,000 shares of no par common.

CHRYSLER FOUR POPULAR ABROAD

DETROIT, July 20—Upward of \$10,000,000 worth of Chrysler fours have been ordered by foreign distributors from the Chrysler Corp. since the introduction of the new models, according to J. E. Fields, vice-president in charge of sales. From the reception accorded the Chrysler four in this country and abroad, the big problem to be met, he says, is to step up production.

A. A. A. FINDS WOMEN COMPETENT TO DRIVE

WASHINGTON, D. C., July 21—From the standpoint of safety, the advent of millions of women drivers must be regarded as an encouraging factor for the reason that actual tests conducted under scientific observation have proved that women drivers are every inch as competent, if not more competent than men, according to a statement issued from the national headquarters of the American Automobile Association.

The A. A. A. statement, which is a direct challenge to the popular belief that a woman at the wheel of an automobile is less dependable than a man, is based on a series of tests recently carried out here by scientists and psychologists.

Paige-Detroit Co. Has New Executive Office

DETROIT, July 22—Completion of the new executive building of the Paige-Detroit Motor Car Co. at the West Warren Avenue plant and its recent occupation marks the first change to be made in the administration office's location of the company in 13 years.

The new executive building which lies along the front of the various factory units is of two-story construction and houses all offices and the experimental department. Behind it is a new engineering building where all experimental work is completed.

The factory service division is the only office which will remain at the Fort and McKinstry location, the site of the old plant. The service warehouse, inspectors are now occupying portions of the former main plant.

The company's first unit was the motor plant, with 200,000 sq. ft. of floor space. After the introduction of the Jewett six, it was decided to make the West Warren avenue plant the main plant and close to 500,000 sq. ft. of floor space was added. This, with addition at various intervals, brought total floor space to 1,200,000 sq. ft.

The offices just given up were occupied at the beginning of the World War.

EIGHT NEW AIR MAIL ROUTES

WASHINGTON, July 21—The Post Office Department will soon call for bids for eight new air mail services between New York and Boston, Chicago and Birmingham, Chicago and Minneapolis, Chicago and Dallas, Chicago and St. Louis, Elko, Nev., and Pasco, Wash., Salt Lake City and Los Angeles, Seattle and Los Angeles. All routes will include important intermediate points and be reckoned on a 90-mile-an-hour basis.

Mechanical Aircraft Conference Proposed

American Society of Mechanical Engineers Sends Questionnaire to Authorities

NEW YORK, July 22—Preliminary steps have been taken by the American Society of Mechanical Engineers to call a mechanical aircraft conference. This would include representatives of aircraft manufacturers, operators, makers of materials and accessories, trade and other organizations, educational institutions, technical press and Government officials.

The society's aeronautics division has issued a letter to those interested in flying and all its branches, sounding out their views on the proposed conference. A questionnaire accompanies the letter. Many favorable replies have been received, according to Alexander Klemm, secretary to the executive committee.

Government Is Interested

C. F. Clarkson, secretary and general manager of the Automotive Engineering Society, said that organization would favor such a conference providing the time was not premature, and the arrangements were handled on a clear, logical basis.

"It seems to me that they are proceeding along the right lines by conferring first with the people in control," he said.

Mr. Clarkson intimated that the Federal Government is interested in the situation and is watching the outcome of the questionnaire.

Letter Society Sent Out

The letter sent out by the aeronautical division reads in part as follows:

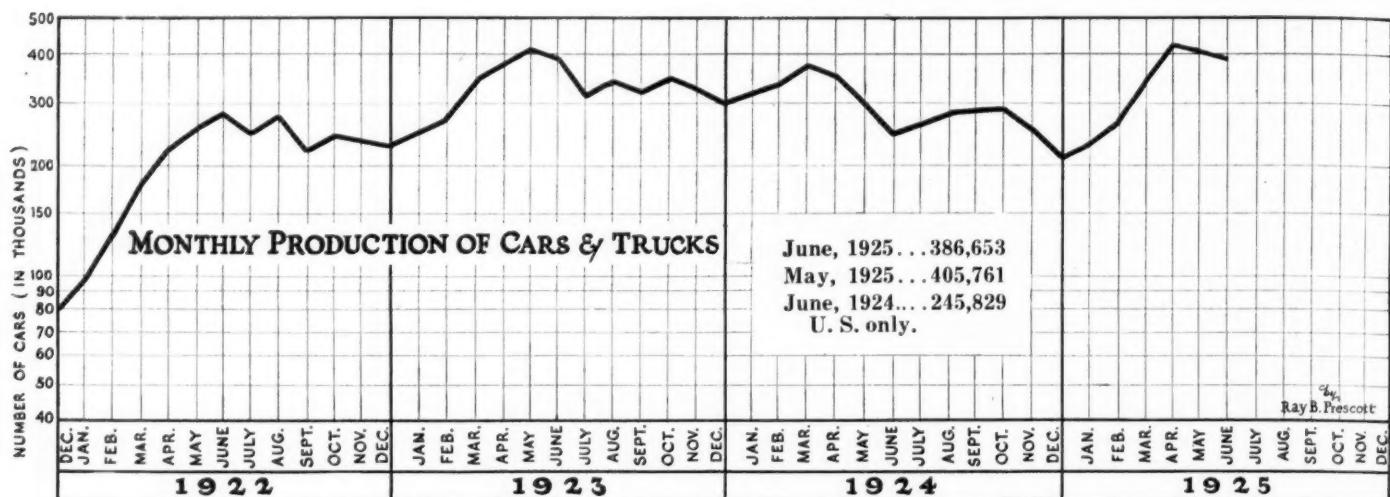
"Do you think that in view of the several recent developments in commercial aviation in this country, such a conference would be timely? Of course, the main purpose, from the Society's point of view, is to review the possibilities of mechanical engineering and the work of the Society as commercial aviation develops.

"In view of your special knowledge of the situation, the Executive Committee of the Aeronautics division would like to ask you whether the A.S.M.E. should take the initiative in developing technical papers on engines."

M. C. NOW USES TRUCKS

DETROIT, July 22—The Michigan Central Railroad has started truck service to handle less than carload freight from Kalamazoo to Mattawan, Lawton, Decatur and other Michigan cities. Eastward service will include Battle Creek and such intermediate stations as Augusta, Galesburg and Comstock. All less than carload freight billed to smaller way stations will be unloaded at Kalamazoo and transhipped by truck. The Hastings Truck Company will provide the service.

June Production at Abnormal Rate



June Car and Truck Production 402,696

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Indications are that July sales will be at least 50 per cent higher than July last year. According to Mr. Hutchinson dealers' stocks were practically exhausted at the start of the month and the orders on the books at the factory are more than the number of cars that can be built during the month.

Bumper Plant Doubles

MILWAUKEE, July 21—Increase of 100 per cent in the production capacity of the Badger Manufacturing Corp. of Milwaukee, makers of automobile accessories, will take place when the company moves into its new quarters in West Allis, according to Charles H. Hathaway, president. Increased capacity will establish the company as the largest manufacturer of automobile bumpers in the United States, according to Mr. Hathaway. The present capacity is about 600 bumpers a day. This will be increased to 1500 in the new plant.

The Badger Manufacturing Corp. was organized in 1918 as a successor to the Auto Parts Manufacturing Co. In 1924 the sales had gone up to \$1,250,000, and it is expected that this will be well over \$2,000,000 during the present year.

Stutz Gains 20 Per Cent

INDIANAPOLIS, July 21—A report issued by Frederick E. Moskovics, president of the Stutz Motor Car Co., covering business for April, May and June, the first quarter during which Mr. Moskovics has been directing the concern, shows a remarkable production, sales and distribution gain, with company affairs at July 1 foreshadowing a steady advance in production and sales.

At the end of June the Stutz factory had a larger number of unfilled orders on hand than at any similar period in

the history of the company. This is in line with the proportion of retail sales to factory production, which has been noted for the past quarter, when actual sales for the territory constantly kept ahead of factory production.

June business showed a 30 per cent increase over May and an increase of distributor connections 30 per cent larger than in the preceding year. The forecast for July, August and September production shows that an even greater advance will be made in these months than in the first quarter.

Nears Production Limit

DETROIT, July 22.—Adding 378,000 sq. ft. of floor space to Ford manufacturing facilities, the new pressed steel plant at River Rouge is rapidly nearing full production capacity. In this building upwards of 1000 presses, some capable of exerting 400 tons pressure, and 500 other machines are being installed. Approximately 6600 men will be employed in this unit alone.

The new building, 1260 feet long and 300 feet wide, is located a mile west of the Fordson switch yards which form the eastern boundary of the plant and is across the River Rouge from the foundry and motors building. The height of the monitor ridges is 60 feet although the building is but one story in height.

To Enlarge Production

SPRINGFIELD, MASS., July 23—Blake Manufacturing Co., maker of die stampings, formings and parts for radio, automotive and tool manufacturers, plans to enlarge its production in the plant it recently occupied, formerly owned by the Victor Saw Works. Most of the old machinery was moved from the Tyler Street plant and much new machinery installed. James L. Shannon, president, reports sufficient orders on hand to keep the plant going for a year at present rate of production, but this will be speeded up at once.

Dodge Bros. to Spend \$8,000,000 for Building

DETROIT, July 21—F. J. Haynes, president of Dodge Bros., Inc., has announced a program of expansion that will increase the capacity of the factory here from 1100 to 1500 cars daily. Construction has been started on five of the eight buildings planned, with construction of the other three scheduled to commence immediately.

The cost of the expansion is estimated at approximately \$8,000,000 and when completed will add several thousand workers to those already employed. The new additions will increase plant space by approximately 750,000 square feet. It is expected that the program will be completed by January 1, 1926. The company's present intention is to go into full production as soon as possible.

Powerplant Planned

A complete series of new buildings as large as many factories is being built on Lynch road. One building, 75 x 500 feet, will house the heat treat department; another, also 75 x 500 feet, will house the heavy hammer shop, and a third, 65 x 500 feet, will take care of the light hammer shop. A die shop, 100 x 312, will be erected. To supply power for these units, a large power plant equipped with the latest and most improved machinery will be built. Railway tracks are already being put down.

The largest of the additions will be a six-story extension of plant No. 2, 100 x 462 feet, and having a floor area of 282,000 square feet. The new forge department on Lynch road places a similar department in the main factory. A new five story building, 205 x 100 feet, will be used for machining and storage purposes. What will be known as main plant No 4, measuring 75 x 475 feet, will connect the machining and storage

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Motor Stocks Firm in Market Decline

Pierce-Arrow, Packard and Mack
Trucks Active—U. S. Rubber Advances

NEW YORK, July 23—After advancing for nine consecutive days and recording the highest average level ever recorded in the history of the New York Stock Exchange, stock prices reacted a couple of points in the middle of the week. The financial community promptly became pessimistic. Much ado was made of a $\frac{1}{2}$ per cent advance in the call money rate; there was sage discussion of the industrial margin of profit and labor unrest was no longer a possibility but a probability. As a matter of fact, there was no change of importance in the fundamental situation of trade and industry and nothing in the action of the stock market to suggest that any important change, other than the usual seasonal quickening of business, is in sight.

Jordan at New Low

In the motor group strength was the rule although there were exceptions, notably Jordan Motors. This stock sold at a new low price for the year despite its report for the first six months showing \$3.12 per share earned, or more than the full year's dividend requirements. The price reductions announced by the Chrysler Corporation brought little selling into that issue, the resultant decline of a couple of points representing traders' activities. Buying of Pierce-Arrow, which held the price near the highest levels of the year, was in anticipation of a half yearly earnings statement expected to show between \$15 and \$16 per share earned on the preferred stock. Packard, too, was firm on reports of orders assuring capacity operations for the ensuing three months, at least. Mack trucks established a new high record for all time without rumors to account for the buying.

U. S. Rubber Advances

United States Rubber was the feature of the tire stocks. As the price of crude rubber soared the price of this stock advanced. The story persists that the company is selling substantial quantities of the product at the present prices from the surplus contracted for at much lower levels. Restoration of dividends on B. F. Goodrich Company common stock at the rate of \$4 annually explained sufficiently the recent strength in that issue.—H. H. S.

MOON ADDS NEW COACH

ST. LOUIS, July 20—A five-passenger coach de luxe model listing at \$1,495 has been added to the Series A line by the Moon Motor Car Co. The new model is finished in two-tone blue-gray Duo with a belt line effect. The lower

panels are blue, the belt panel gray with black beads and the upper panels in black. The rear quarter and back panels are leather covered, and black and nickel-plated landau irons are fitted. The hood louvers are striped in ivory. The upholstery is tan corduroy.

Equipment on this model includes dome light, plain silver finish hardware, sun visor integral with top, one-piece ventilating windshield with nickel-plated regulator close to steering wheel, drum head and cowl lamps, and hydraulic four wheel brakes. A special feature of the new coach is the width of the doors and the roominess of the interior.

Steel Forging Corp. Buys Weldless Rolled Ring Co.

CLEVELAND, July 22—The Weldless Rolled Ring Co. has been acquired by the Transue-Williams Steel Forging Corp. of Alliance, which gives the Alliance company a new process for making rings and drive gears and other circular forgings.

S. V. Hunnings, former president of the Cleveland corporation, now in charge of organizing the new department at the Transue-Williams plant at Alliance, says his company production had expanded to a point where it was necessary to get much extra equipment or to consolidate with a larger concern. Operations in the new department will start in August.

Wilson Foundry Acquires Michigan Drop Forge Co.

PONTIAC, MICH., July 21—Purchase of the land, plant and equipment of the Michigan Drop Forge Co., by the Wilson Foundry and Machine Co., a subsidiary, is announced by D. R. Wilson, president of Wilson Foundry and Machine Co.

The Wilson Foundry Co., makers of all engines for Willys-Knight and Overland cars, will use the property for future expansion. The property, located next to the Wilson Co., consists of about five acres, the plant being completely equipped for drop forge work. It ceased operations about a year ago and since then has been idle.

Electric Service Men to Convene in September

CLEVELAND, July 23—The general meeting of the Automotive Electric Service Association will be held at Forest Inn, Eaglesmere Park, Pa., September 14-17, according to Earl Turner, manager. The first sessions will be devoted to the legal and patent committee, the standardization committee and the service managers committee, whose reports will be submitted to the governors later.

Members of the Board will be guests of the electrical equipment, storage batteries and miniature lamp manufacturers.

Rates Reduced 25% in G. M. Insurance Plan

N. Y. State Commissioner Says
Project Is Within Law—
Officers Named

NEW YORK, July 23—The rates filed with the State Insurance Department by the General Exchange Insurance Co., recently organized by General Motors Corp., show reductions of about 25 per cent from those fixed by the underwriters' conference on automobile fire and theft risks. Commissioner James A. Beha has ruled that the plan is entirely legal.

The rates, which are effective August 1, are to be applied to the new cars of the makes produced by the General Motors Corp. and the insurance at these rates in the General Exchange Insurance Co. is to be obligatory as to cars bought under the financing plan, but optional as to cars bought outright for cash. The 25 per cent reduction is supposed to take account of the fact that the insurance will be placed without acquisition cost.

Combine Fire and Theft

The rates filed are combined fire and theft rates and the insurance company does not propose to segregate the hazards except for accounting and statistical purposes. Purchasers of cars on the financed basis will be obliged to have both the fire and theft hazard covered anyway. The General Exchange has also filed rates applicable to used cars. This schedule goes back to the old method of the National Conference in that the rates are based upon the list price of the car instead of an arbitrary sliding scale of depreciation.

As regards the older makes of cars the schedule filed by the company establishes a dividing line with the 1923 makes of cars. This is based upon the assumption that cars since that date are modern construction, while those prior to that are older and varying forms.

Additional concessions in the rates filed for collision and property damage are made for four-wheel brakes, of which the General Motors is a strong advocate.

The General Exchange Insurance Co. starts with a paid-in capital and surplus of \$1,500,000, and its officers are Curtis C. Cooper, president; John J. Schumann and Livingston L. Short, vice-presidents; Lewis L. Lukes, treasurer, and George H. Bartholomew, secretary.

MAR TAN CO. BUYS PROPERTY

CHICAGO, July 22—The Mar Tan Motor Manufacturing Co. has purchased a plant in Milwaukee, formerly owned by the Milwaukee Timer Co. This addition will give the Mar Tan Motor Manufacturing Co. much needed space, enabling it to handle business which could not be accepted at the old factory.

Steel Demand Fails to Justify Price Advance

Automotive Industry Continues to Buy Steadily and Market Holds Fairly Firm

NEW YORK, July 22—Although the steel market's tone has turned considerably firmer, there is not the slightest indication of a sufficient broadening of the demand to support out-and-out price advances. Prices for this or that product may be adjusted so as to harmonize the steel price structure as a whole, but producers recognize that what improvement has taken place has been relative.

Compared with recent conditions, the market has gained strength, but there is still wide room for improvement. Because of the exigencies incidental to the production of new models, some of the recent automotive demand for steel has seemed unduly urgent. Purchasing agents would send telegram after telegram to make certain that the steel would be on hand when production managers would want it. While the automotive industry continues to buy steel at a very gratifying rate, there has been no quickening of the demand. Some steel bar orders are hanging fire because of a deadlock between mills and automotive consumers, the former holding out for 2c., Pittsburgh, while the latter point to recent concessions of \$2 per ton made to a large automotive consumer as reason for their unwillingness to pay the 2c. level.

Sheet Market Now Leads

The sheet market which was under greater pressure than any other product a month ago now leads in strength. Some rollers of full-finished automobile sheets intimate that a somewhat higher than the 4.25c. price is on the way. Sheet bars are firm at \$35. The market for cold-rolled strips seems to have settled on a 3.75c. basis, and at this price liberal orders have been placed by automotive users. Steel producers are greatly encouraged by reports that more steel is to be used per unit in new models, especially so by the report that the new closed body models of the leading low-priced passenger motor car builder will be of all-steel construction.

Pig Iron—Foundry iron prices are just about holding their own. Automotive melters appear to be well protected by stocks or contracts, and what little fresh demand crops out seems to be mostly of single carload proportions.

Aluminum—Arrivals of European metal are relatively heavy, but most of this aluminum, if not all of it, is due to consumers on outstanding contracts. Prices ride on an even keel. Competition in the secondary aluminum market is keen, with the demand fairly good.

Copper—The red metal appears to have been definitely lifted out of its rut, and there is more confidence in predic-

tions of a 15c. market before very long. Manufacturers of finished copper and brass products continue to derive good support from the automotive industries.

Tin—The tin market both here and in London appears to be once more of a highly speculative character. Prices have been lifted to levels that make consumers uneasy, lest market manipulation again bring 60c. tin.

Lead—The leading producer announced an advance of \$2 a ton this week, bringing the price up to 8.10c., New York, which is still below the level prevalent in the "outside" market.

Zinc—Demand for brassmaking is now better than for galvanizing. The market rules quiet and steady.

Four-Passenger Blimp Produced by Goodyear

AKRON, O., July 23—Marking what may be a new era in transportation, the Goodyear Tire & Rubber Co.'s new air yacht, "The Pilgrim," was christened Saturday, July 18, at Stow flying field. The eyes of transportation men and air experts will be turned on future tests of the tiny aircraft.

"The Pilgrim" is driven by a sixty horse power Lawrence radial motor. It consumes no more gasoline and oil than a high powered automobile, according to engineers. Maximum speed is about 65 miles an hour.

The little ship is the smallest blimp ever constructed, being one-fiftieth the size of the Los Angeles. It can be manufactured as cheap as a high grade automobile.

Called Family "Air Coupe"

The ship is 110 feet long, and the bag is thirty feet in diameter, holding 50,000 cubic feet of gas. Accommodations are arranged for four persons. It has been truly called a family "air coupe."

Invention of portable mooring masts, to which the small ships may be anchored is expected to soon bring about their general use, according to Mr. Litchfield.

"The Pilgrim" will be in command of J. N. Yolton, manager of aeronautical work at Goodyear, during tests and trips this summer.

The air meet at which "The Pilgrim" was christened was the preliminary event of Akron's centennial celebration week. Many army balloons and fliers took part.

All the tire manufacturing companies entered elaborate and artistic floats in the big parade on Monday.

PRISONERS MAKE TAGS

BALTIMORE, July 23—Maryland automobile tags for 1926 will have a black enameled background and white enameled lettering. The tags will be made by the prisoners in the shops of the Maryland penitentiary. The order calls for 260,000 sets.

Automotive Industries
July 23, 1925

FINANCIAL NOTES

Fisk Rubber Co. has put preferred stock on a \$7 annual dividend basis by declaring a quarterly dividend of \$1.75 a share, payable Aug. 1 to stockholders of record July 27. In the two previous quarters this year dividends of \$1 each were paid. These payments marked the resumption of dividends which were suspended during the spring of 1921. A total of 27 $\frac{1}{4}$ per cent in back dividends is due on this issue.

Dodge Brothers Co., Inc., has converted between \$3,000,000 and \$4,000,000 worth of debentures into common stock under the provision of their sale by which they were convertible at \$30 a share. Maximum of debentures admitted to be convertible at that price was \$5,000,000. Additional \$5,000,000 of debentures are convertible into common at 35, when, if and as the stock reaches that price.

Norwalk Tire & Rubber Co. has introduced its common stock to trading on the New York Curb. The company is capitalized at \$1,184,300 of 7 per cent cumulative preferred stock and \$995,000 of \$10 par value common. The only other capital liability is \$750,000 of ten-year 7 per cent sinking fund gold notes. William B. Miller, president, will retain control of the common stock.

Moline Body Corp. has called for payment Sept. 1, 1925, the entire issue of its first serial 7s, due March 1, 1926-33, at interest and 100 $\frac{1}{2}$ for 1926 maturities; 101 and interest for 1927; 101 $\frac{1}{2}$ and interest for 1928; 102 and interest for 1929; 102 $\frac{1}{2}$ and interest for 1930; 103 and interest for 1931; 103 $\frac{1}{2}$ and interest for 1932, and 104 and interest for 1933, at the Northern Trust Co., Chicago, Ill.

Mack Trucks, Inc., rights have been admitted to dealings in the New York stock exchange. It has been ruled that transactions in Mack Trucks, Inc., common stock shall be quoted ex rights July 20 and that transactions in rights are to be settled July 30. The right to subscribe expires Aug. 3.

Marland Oil Co. earnings are running \$2,000,000 a month after charges and reserves. For the first six months of this year they are expected to exceed \$8,250,000, or \$5 a share. In the first three months Marland earned net profits \$3,622,971, equivalent to \$2.19 a share.

McCord Radiator Co. has declared its regular quarterly dividend of 50 cents on class B stock, payable Aug. 1 to stock of record July 23. Net earnings last month after all charges were \$109,505 and for six months \$526,286.

C. G. Spring and Bumper Co. with 150,000 authorized shares of common stock, no par value, and 100,000 authorized shares of 8 per cent cumulative preferred stock, par value \$10, is admitted to unlisted trading privileges on the New York Curb.

Brockway Motor Truck Corp. with 15,000 authorized shares of 7 per cent cumulative preferred stock, par value \$100, has been admitted to unlisted trading privileges on the New York Curb Exchange.

Moto Meter Co., Inc., received subscriptions in excess of a new issue of 200,000 shares of class A participating no par stock offered through Lage & Co., syndicate manager.

The Edmund & Jones Corp. has declared an extra dividend of 50 cents a common share, payable July 25 to stock of record July 20.

Accessory Sales Gain 33 1/3% Over 1924

Figures for First Six Months Report Plants Operated at 79 Per Cent Capacity

NEW YORK, July 22—The business of automotive parts, accessory and service equipment manufacturers for the first half of 1925 ran substantially ahead of the same period in 1924, according to figures compiled by the Motor and Accessory Manufacturers Association. A large number of representative makers of products sold to the motor car and truck manufacturers, the wholesale and retail trade and the motoring public reported an average increase in the wholesale value of their shipments to customers one-third in excess of the first six months of the year. The same companies reported that their plants had operated at an average of 83 per cent of capacity during this period and were operating on July 1 at 79 per cent of capacity.

Seasonal Decline Below Normal

Sales reports for June, also compiled by the association, showed considerably less than a normal seasonal decline from the high levels of April and May. The M. & A. M. A. index of sales for June stood at 158 per cent of January as compared with 165 per cent of January in May. By divisions of the industry the index showed sales of units, parts and accessories to motor vehicle manufacturers in June 164 per cent of January sales as compared with the May figure of 174 per cent of January sales. Replacement parts sales to the trade in June were 129 per cent of January sales as compared with 134 per cent in May, accessory sales to the trade were 172 per cent of January as compared with 173 per cent in May and maintenance equipment sales showed a gain, aggregating 159 of January as compared with the May figure of 146 per cent.

Average Gain Is Shown

Aggregate sales reports on which the June figures were based approximated \$17,000,000, with considerably over \$10,000,000 reported by makers of original equipment. The largest June business reported by a single company was in excess of \$2,000,000, comprising largely parts for original equipment.

Detailed figures on operations during the first six months of the year reported to members of the M. & A. M. A. in the June Business Bulletin showed an average gain of 33 per cent over the first half of 1924 on the part of 54 companies representing all divisions of the industry. Forty-six companies reported an average of 83 per cent of plant capacity in operation during the first six months while 44 companies' figures were

FLOODLIGHT OUT 85 YEARS AGO AIDS FLIERS

WASHINGTON, July 23.—A step in aviation which promises to revolutionize night flying was taken at Brown Field, Quantico, Virginia, this week when Marine Corps fliers successfully tested a new 500,000,000-candle-power aviation field landing light. The gigantic "lantern" is not a searchlight, but diffuses a vast rainbow glow over the field. By its use it is hoped to eliminate the glare which is so often annoying to descending fliers. It is a mere electric arc light placed behind a light house lens and was invented eighty-five years ago by a Frenchman named Fresnel.

W. G. Mayo, chief executive for Henry Ford, was among the spectators and declared he was "very much interested." This is taken to indicate that Mr. Ford is interested in this phase of aviation. The experiments were conducted by the BBT Corporation.

included in the average of 79 per cent of plant capacity in operation July 1.

Reports of sales by automotive jobbers throughout the United States and Canada showed a gain for the first half of the year over 1924 and a substantial advance in June over business of June a year ago. The jobbers' June business ran ahead of May in 13 of the 18 wholesale territories.

Chevrolet Reports Fleet Orders for Sales Forces

DETROIT, July 22—Fleet orders for Chevrolet passenger cars and trucks are being received in increasing number from large organizations throughout the country whose investigations have proved the economy of motor transportation, according to R. H. Grant, general sales manager of the Chevrolet Motor Co.

Besides enjoying the psychological advantage over the salesmen who arrive on foot, the salesmen with the passenger car can make three times as many calls and can spend more time with each customer according to figures which Mr. Grant has compiled.

SPAIN CUTS TRACTOR DUTIES

WASHINGTON, July 21—Spanish tractors not used for agriculture, formerly dutiable under item 515 of the Spanish customs tariff, at the rate of 75 pesetas per 100 kilos gross, are now dutiable under item 568 at the rate of 25 pesetas per 100 kilos gross, according to a royal decree cabled to the Automotive Division of the Department of Commerce.

American Cars Hard Hit by McKenna Duty

Only Makers of Low-Powered Models Can Compete, Says Hudson Official

DETROIT, July 21—American automobile manufacturers are confronted with a situation in Great Britain since the re-imposition of the McKenna tax duty, which went into effect July 1, that will test their engineering and manufacturing ability to the utmost, if they wish to compete with the manufacturers of British passenger cars.

The same applies to Fiat and Citroen, but to a much smaller degree. The American manufacturer is the one that has been dealt the heavy blow.

In the opinion of O. H. Williams, managing director of Hudson-Essex, Ltd., of Great Britain, the re-imposition of the 33 1/3 per cent duty means the elimination of the middle and higher price American passenger cars from the British market. Cars having a low rating hp. will not be affected.

Cheap Car Has Advantage

Mr. Williams, in Detroit recently for conferences with Hudson-Essex factory executives, said it was his belief that the American manufacturer would be closed out of the British market if he could not conform to the conditions created by the re-imposition of the tax.

"American manufacturers to successfully compete with those in Great Britain must reduce the price of their cars," Mr. Williams said. "Every dollar cut means a saving of the tax. We know that between two cars in the same class, the British buyer will purchase the one that costs less."

Closed Car More Popular

"A good deal of what the manufacturers in this country will face depends upon the future action of the British manufacturer. If they increase their prices, the American manufacturer's problem is lessened that much. But such a course does not seem likely. The competition offered by Citroen and Fiat in the past, while not as keen as that offered by American passenger cars, will also be lessened. They will face the same conditions as the manufacturers in this country."

The closed automobile is rapidly gaining favor throughout the whole of Great Britain, according to Mr. Williams, and their proportion of production during the coming season will be much greater than in the past. Morris, often called the Henry Ford of England, and who is said to produce approximately 40,000, is figuring on producing closed types on a larger scale during the 1925-26 season than he has in the past.

Chrysler Determined on Insurance Project

Willing to Adopt Plan Acceptable to State, but Will Not Withdraw

NEW YORK, July 22—That the Chrysler Motor Corp. fire and theft coverage insurance included in the price of Chrysler cars sold to individuals, having been issued under Michigan laws and being valid there, is also, in their opinion, valid in New York State, is declared by Cabell, Ignatius and Lown, attorneys for the Palmetto Fire Insurance Co., underwriter of this insurance.

Their statement was issued in reply to notification from James A. Beha, New York State Superintendent of Insurance, that the Chrysler-Palmetto insurance contract is a Michigan contract with which his department "has no concern provided the cars insured thereunder are not risks in the State of New York and further provided that no steps are taken to put the contract into effect in this State."

No Complaint Is Lodged

The Palmetto attorneys described this notification as "in the nature of an opinion," and say that so far as they know no formal complaint has been lodged with the New York Insurance Department against the Palmetto Co. They declare:

The Chrysler dealer cannot be considered an agent, because he does not solicit the insurance and has absolutely no control over it. He does not remit to the insurance company and is not even in communication with it. He does not give the car buyer any insurance certificate. He is not even called upon to know how much of a premium the insurance company receives.

The plan is simply group insurance and works to the benefit of the car buyer in the same way as does quantity production. Insurance is an essential, and if the manufacturer, by buying it wholesale and cheap, can pass the savings on to purchasers, the public is benefited in the same way as if the manufacturer bought large quantities of steel or finished wheels.

Misunderstanding Blamed

We feel sure that when the operation of this plan is fully explained to insurance officials they will follow the example of certain commissioners who have already approved the plan after hearings. The plan is sound and legal and will be upheld by the automobile industry, by the courts of law and by public opinion.

"If any means can be devised," their statement continues, "whereby the objections can be met without abandoning the plan, we will attempt to meet these objections; otherwise it is probable that a test case will be agreed upon to try out the legal aspects of the whole situation."

A statement of the facts in law applicable to the situation will be sent by

the attorneys to all insurance commissioners.

Chrysler officials contend that their agents are selling automobiles with insurance as an accessory, just the same as headlights, bumpers and other extra equipment features.

Walter P. Chrysler, president, says the plan, provided for the benefit of Chrysler buyers, would probably save them at least \$3,000,000. He says:

We have been advised that the plan is legal. We know that it is for the benefit of the public. In these circumstances we intend to stand behind it and behind our dealers and to do whatever may be legally necessary to contest any move that is made to interfere with us or with any of our dealers in the conduct of our legitimate business for the benefit of the public.

If in this connection those interests opposed to the plan attempt to secure an interpretation of laws passed for the protection of the public so as to prevent our giving the public the benefit of savings which others have not been able to provide, we are prepared to contest the matter to the full limit.

Dodge Bros. Will Spend \$8,000,000 for Buildings

(Continued from page 152)

plant. It will also be five stories in height and will complete an L shaped unit.

When Dodge Brothers first started operations in 1914, the company had few buildings with a total floor area of 20 acres. Today it consists of 110 acres and with the additions of the new buildings, the acreage will be brought to 130 acres, making the Dodge factory one of the largest in the world. The present buildings will be erected by the construction department of the company which has erected all the previous buildings of the factory.

Haynes Issues Statement

Frederick J. Haynes, president of Dodge Brothers, issued the following statement:

Continually oversold since the business began, and particularly oversold this year in spite of the fact that production has been constantly in excess of 1100 cars a day, the management is determined to take extraordinary measures to meet the requirements of its dealers in 1926, and the new expansion program, the largest in the history of Dodge Bros., is the result.

The Dodge Brothers' factory is one of the most compact in the world and the new buildings fit perfectly into the vast system of production. Flanking a series of main buildings on one side are huge warehouses, where the raw materials are received and fed out into the various machining departments. On the other side of the main buildings are the great assembly plants into which the machining departments feed their finished products.

The reputation of Dodge Brothers' motor car and the character of the Dodge Brothers' dealer organization plus our determination to make a good car continually better, leaves no possible doubt as to our future market. Our only fear is that even 1500 cars a day will be insufficient for the requirements of 1926.

Business Sound as Shown by Earnings

Dividends Also Indicate Healthy Condition of Automotive Industry

NEW YORK, July 23—Earnings statements by concerns in the automotive industry, with announcements of dividends, continue to show the sound condition of business.

Chrysler Corp. for three months ended June 30 reports \$4,689,000 net profit before reserves for Federal taxes, comparing with net profit of \$3,501,226 for the first quarter.

Net profit of \$8,197,000 for the first half year compares with net of \$464,440 reported by Maxwell Motors Corp., absorbed by the Chrysler Corp. a few months ago.

Goodrich Declares Dividend

Directors of the B. F. Goodrich Co. have declared a quarterly dividend of \$1 on common stock payable Aug. 15 to stock of record Aug. 3. This is the first declaration on the issue since Feb. 15, 1921, when it disbursed \$1.50. The company also declared the usual quarterly \$1.75 on preferred, payable Oct. 1 to stock of record Sept. 15. Net profit was \$7,106,615 after depreciation, Federal taxes, interest, etc., for half-year ended June 30, was equal after preferred dividends to \$9.84 a share on 601,400 no par common, against \$2,755,017, before Federal taxes, or \$2.51 a share, in the same period of 1924. Net sales for six months were \$60,400,000, against \$50,137,665 in the first half of the previous year. L. D. Brown, treasurer, and H. Hough, comptroller, were elected vice-presidents.

Borg & Beck Co. Profits

Borg & Beck Co., for the six months ended June 30, reports net profit \$276,700 before Federal tax reserves, equal to \$2.21 a share on 125,000 shares of capital stock of \$10 par value outstanding.

Gabriel Snubber Earnings

Gabriel Snubber Manufacturing Co. has announced net earnings for the first six months were approximately \$770,000, or \$3.85 a share, on 200,000 shares of capital stock.

Stewart-Warner Dividend

Stewart-Warner Speedometer Co. declared the regular quarterly dividend of \$1.25 a share, payable Aug. 15 to stock of record July 31. Earnings for the June 30 quarter show net profit of \$2,163,000, or \$3.60 a share, against \$1,303,972, or \$2.17 a share, in the first quarter of this year. Net profit in second quarter of 1924 was \$512,850, or \$1.08 a share. Net profit for the first six months amounted to \$3,466,972, or \$5.777 a share, as contrasted with \$2,009,555, or \$4.23 a share, in 1924.

Ford's \$1,706,000 Bid Likely to Win Fleet

Shipping Board Delays Acceptance for Legal Opinion, but Deal Is Considered Closed

WASHINGTON, July 23.—Henry Ford this week looms in a new role—that of a potential shipping magnate with 200 vessels under his command.

Although final action on Ford's bid of \$1,706,000 for the Shipping Board vessels was delayed by a question of legality of the sale, it was indicated the Board would approve the offer which has been recommended by President Palmer of the Emergency Fleet Corp. These ships which cost a half million dollars or more apiece will thus fall into the hands of the motor car manufacturer for less than \$8,000 each.

The protest of the Boston Iron and Metal Co., of Baltimore, that the negotiations were irregular because its original bid of \$1,370,000 was rejected by the Board, was swept aside by an opinion of Chauncey G. Parker, general counsel of the Fleet Corp., accompanying Palmer's recommendation. Parker held the procedure in conducting the sale to be entirely legal.

While the 200 vessels were set aside for scrapping by the Board, Ford indicated in his offer that he expected to retain some of the vessels and replace the steam engines with Diesel engines. He will use some of the engines and other equipment taken from the scrapped ships in his factories.

Yellow Cab Stockholders to Ratify Merger Project

NEW YORK, July 23.—With a meeting of stockholders of the Yellow Cab Manufacturing Co. set for Aug. 18 in Portland, Me., to ratify the recently announced merger plan with the General Motors Corp., preliminary steps toward an amalgamation of the interests are already under way. Engineers are now in Pontiac and Detroit making a survey of the General Motors truck properties.

Meanwhile, proxies are being prepared for mailing to stockholders. Indications are that the two-thirds vote necessary for the ratification for the proposed merger will not be lacking.

"We have every reason to believe that our stockholders are overwhelmingly in favor of the merger," said John Hertz, who is to become chairman of the board of directors of the new corporation, which is to be known as the Yellow Truck and Coach Manufacturing Co.

The financial advantages of this merger are an important factor to be considered. General Motors' widespread banking facilities will not only provide for the financing of the cab, coach, truck and Drivurself sales, but also place us in touch with the money markets of the world."

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, July 22.—Trade and industry continue moderately active, in view of the retarding influences of the season. As compared with the situation a year ago, present rates of activity are distinctly favorable. Both stock and commodity prices have been firm, with an upward tendency, for several weeks. Increased firmness has been apparent also in money rates. Crop progress has been good in most sections.

Employment in manufacturing industries last month was 1.1 per cent lower than in May, according to the Department of Labor. The aggregate earnings of employees decreased 3.1 per cent and per capita earnings 2.1 per cent. Curtailment was shown principally in the automobile, boot and shoe, cotton goods and iron and steel industries.

The world's wheat crop this year is estimated by the Department of Agriculture as about equal to that of last year. In the sixteen countries producing about 75 per cent of the world's total outside of Russia and China, the indicated crop is 2,366,000,000 bushels, as compared with 2,363,000,000 bushels a year ago.

Domestic consumption of lint cotton last month amounted to 493,765 bales, as against 531,471 in May and 350,021 in June last year. Last month's exports of 217,786 bales compare with 330,967 in the preceding month and 230,979 a year earlier.

Exports and imports of merchandise in June practically balanced at \$326,000,000 according to the preliminary report. For the fiscal year ended June 30, the export total was \$4,858,000,000, the largest since 1921, while imports amounted to \$3,825,000,000, the largest since 1920. For the seventh successive month, gold exports exceeded imports. The net exports, amounting to \$2,286,345, were slightly larger than in May, but smaller than those of any other month since the export movement began.

The stock of money in the United States decreased by \$49,178,293 during the month ended July 1. The principal declines were \$37,140,000 in Federal Reserve notes, \$5,729,939 in gold, and \$150,000 in silver dollars.

Fisher's index of wholesale commodity prices stood at 160.5 last week, as compared with 159.3 a week earlier and 158.9 two weeks earlier.

Earning assets of the Federal Reserve banks increased only \$500,000 during the week ended July 15, gains of \$4,400,000 in discounts and \$5,500,000 in holdings of Government securities being approximately offset by a decline of \$9,400,000 in open market purchases.

Gray Plant to Build Gas-Electric Buses

American Concern Plans Production at Detroit Under Patents of Tilling-Stevens

NEW YORK, July 22.—Preparations are being made for the production of the Tilling-Stevens Gas-Electric Drive Bus, by the American National Omnibus Corp. of New York, as a result of the reorganization of the Gray Motor Corp. of Detroit. It is understood that the Gray Motors plant will be utilized for bus production, along with the automobile activities of the company.

An official statement is expected from E. M. Howe, president of Gray Motors, during the next week, in which the reorganization will be described in detail. Meanwhile it is learned at the New York offices of H. H. Melville, president of the American National Omnibus Corp., that a number of the Tilling-Stevens buses will be on display at the American Electric Railway Association Convention at Atlantic City, Oct. 5-9, and that deliveries will commence Nov. 1.

Three types of buses are under production—the single deck pay-enter city type; fully inclosed double deck city type, and super de luxe touring. They are being built under the patents of the Tilling-Stevens Motors, Ltd., of England. The buses have been described previously in AUTOMOTIVE INDUSTRIES.

Beeh Makes Statement on Bosch Magneto Litigation

NEW YORK, July 22.—Louis Beeh, vice-president of the Robert Bosch Magneto Co., Inc., New York, made the following statement relative to a suit commenced by the American Bosch Magneto Corp. of Springfield, Mass., to restrain the Robert Bosch Magneto Co., Inc., from selling magnetos and other electrical automotive products bearing the name "Bosch":

The suit which this concern has started is merely an answer on their part, it would seem, to an earlier suit brought by Otto Heins, president of the old Bosch Magneto Co., and now pending in the District Court for the Southern District of New York, against A. Mitchell Palmer, Francis P. Garvan, two former Alien Property Custodians; Martin E. Kern and the American Bosch Magneto Corp. The charge in this complaint is fraud and conspiracy on the part of all the defendants and damages in the sum of \$1,000,000 is asked against each of them.

In this suit Mr. Heins requests that the sale of the stock, assets, patents, etc., of the Bosch Magneto Co. by A. Mitchell Palmer, Alien Property Custodian, be set aside. The charge in the complaint is that the sale of the Bosch property in war times to Martin E. Kern was illegal.

Men of the Industry and What They Are Doing

New Assistant Chief

Appointment of Irving H. Taylor, Detroit, as assistant chief of the Automotive Division, Bureau of Foreign and Domestic Commerce, is announced by Director Percy Owen. Mr. Taylor succeeds Harry H. Kelly, who has been transferred to the Paris office.

Mr. Taylor, 29 years of age, entered the automotive industry in 1916, after graduating from Princeton. He comes to his new position from that of an executive in the export department of the Dodge Motor Co., where he had been a general sales promoter and director of car distribution.

For seven years before he joined the Dodge company Mr. Taylor was associated with W. H. Lalley, formerly Studebaker export manager in Detroit.

Latin Delegates Named

Adolfo Arellano, prominent Havana engineer and Alberto Alexander, Chief of the Inspection Service, Department of Public Roads, Peru, will be delegates to the Pan American Road Congress, to be held at Buenos Aires, October 3-13, according to information received by the Pan American Confederation for Highway Education.

McDonald Sails to Europe

Stewart McDonald, president of Moon Motor Car Co. and Diana Motors of St. Louis, Mo., sailed for Europe on the Mauretania recently for a three months' visit. With Mrs. McDonald he plans an extensive vacation tour of England, Scotland and the Continent. At the same time he will push the sales of Diana cars abroad.

Poggenburg With Velie

C. W. Hadden, general sales manager of the Velie Motors Corp., announces the appointment of George W. F. Poggenburg as district representative in the Philadelphia district. Mr. Poggenburg has had a long experience in the automobile industry, having started his career in 1908 with the American Automobile Co.

Dreiske With Rolls-Royce

Victor C. P. Dreiske, for nine years with the Locomobile Co. and for two years manager of the Chicago branch, is now western district manager for Rolls-Royce of America, Inc., with headquarters at the Chicago branch, 2512 S. Michigan Avenue.

Mackinnon with Oakland

Ross Mackinnon, general sales manager of Chevrolet Motor Co. of Canada, Ltd., has been put in charge of the sale and distribution of the Oakland line of cars in addition to his present duties. E. R. Birchard will act as his assistant.



Irving H. Taylor

New Manager for Flint

J. W. Holliday has been appointed manager of the Minneapolis branch of the Flint Motor Co. He has been connected with the trade a long time. The Minneapolis branch was opened when the Flint first appeared on the market.

J. J. L. Ardiel Joins Cadillac

J. J. L. Ardiel, who for the past two years has been assistant sales manager for the Chevrolet Division at Oshawa, Ont., has been appointed sales manager of Cadillac Motor Car Co. of Canada, Ltd., duties to start immediately.

Christal Is Called In

J. M. Christal, for the past four years working out of Dallas with the wholesale department of the Studebaker Corp., has been transferred to the newly organized chassis department at the general offices of the company.

A. B. C. Hardy Honored

A. B. C. Hardy, former president of the Olds Motor Works, now resigned, was guest of honor at a dinner given by 40 key-note men of the Olds Motor Works. Mr. Hardy was presented with a walnut writing desk.

British Director Is Visitor

O. H. Williams, managing director of Hudson-Essex Ltd., Great Britain, was in Detroit recently for a short conference with various executives at the home office. He spent less than three days in this country.

New G. M. Executives

Joseph L. Myers, general manager and Glynn Davies, manager of the foreign department of General Motors Acceptance Corp. have been elected vice-presidents.

Kreusser Now With G. M.

O. I. Kreusser has been appointed engineer-in-charge of the General Motor Corp. proving ground at Milford, Michigan, succeeding F. M. Holden who recently joined the Oakland Motor Car Co.

Chicago Man In Oakland

Lester Rich, formerly sales manager for the Bird-Sykes Co., Paige-Jewett dealers and distributors in Chicago, has become retail sales manager of Community Motors, Inc., Oakland dealers.

Muffy on Research Work

Glenn Muffy has been appointed special representative of I. J. Reuter, president and general manager of Olds Motor Works, on commercial research work for the company.

Zinke Directs Retail Sales

G. J. Zinke has been appointed retail sales manager of the Milwaukee Flint Co. Mr. Zinke has been proprietor of the Zinke Auto Co., Cudahy, Wis., for many years.

Schubert General Manager

Frank R. Schubert has been appointed general manager of the Strom Ball Bearing Manufacturing Co., Chicago. John Diesk succeeds him as works manager.

Massey Joins Diamond Co.

L. B. Massey of the Motor Transport Co., Minneapolis, has joined the sales force of the Diamond T Motor Car Co. as Chicago district sales manager.

Stoops Gets Promotion

H. J. Stoops, formerly sales manager of Motor Products Co., Detroit, is now one of the vice-presidents and probably will have charge of advertising.

Assists Chevrolet Sales

Leo G. Ford, formerly with the Chevrolet factory as field representative, has joined the New Orleans Chevrolet Sales Co. as assistant to the sales manager.

Raskob Sails for Paris

John J. Raskob, Jr., of General Motors Corp., has sailed for Paris on the Cunarder Mauretania.

California Protests Used Car Sales Plan

Low Down and Time Payments and Several Turnover Profits Cause Complaints

SAN FRANCISCO, CALIF., July 22—Dealers in new cars and rebuilt used cars of higher-priced models are complaining throughout California of the low prices at which used cars can be bought on time payments. It is possible now in most of the larger cities to buy a used car of 1922, 1923, or even 1924 model, for as low as \$50 down and \$20 a month. Total price on each car is lower than it ever has been before. The cars are being sold "as is," to be overhauled and rebuilt at an extra charge, if the buyer wishes, but otherwise just as they were received from the previous owner.

Cut in On New Car Sales

This condition applies largely to cars selling new at \$1,500 or less delivered on this coast. Dealers in "as is" used cars have sprung up like mushrooms all over California, and are cutting noticeably into sales of dealers in new cars and rebuilt used cars.

The current arrangement is 15 per cent down and the balance in 20 equal payments, with interest at eight per cent. Hundreds of these cars have been bought by comparatively low-salaried workmen and others, who make the first payment, possibly cover the first monthly payment, use the car for awhile and then return it to the vendor.

This amounts merely to a constant turnover of used cars. In addition to increasing sales-resistance for new as well as rebuilt cars, it keeps the market flooded with low-grade used cars.

How the Plan Works

One used-car dealer in Oakland sold the same car, for which he originally paid \$150 five times in the past year. His original price on the car was \$300, on which he received \$45 and 12.75. His second price also was \$300, on which he got \$45 and two months' payments, \$25.50. His third sale was for \$250 and he obtained \$37.50 and \$10.65. His fourth sale was for \$200, on which he received \$30 and \$8.50, while his fifth sale was for \$100 cash. Interest he collected is not included, but he had received approximately \$315 net for a car which cost him \$150, and the interest he received, probably around \$20, paid for costs of getting back the car in each instance.

This is only an average example. There have been scores of cases in which profits as high as 500 per cent have been made on one used car of good external appearance.

Some Say Law Is Needed

Dealers in new cars cannot afford to make first payments so low, nor to dis-

DEPARTMENT STORE SELLS AUTOMOBILES

BOSTON, July 23—The Gilchrist Co., one of the largest department stores in Boston, has signed a contract to sell Hudson and Essex cars in its building as a sub-dealer under the Henley-Kimball Co.

The Gilchrist Co. occupies a large building on Washington Street, in the heart of the department store district. It is remodeling part of its store with a separate entrance on Winter Place, where the cars will be displayed.

This is said to be the first time any New England department store has gone into the sale of automobiles.

tribute monthly payments over so long a time. Dealers in rebuilt cars are in about the same position, and both are confronted with one of the most serious problems which has appeared in the automotive industry in California.

There is some talk of an effort on the part of dealers' associations to obtain passage of a law limiting the time over which payments on new or used cars can be spread, and also to have the State government take over supervision of used car sales, with a minimum limit on first payments. Some dealers consider this course impractical.

URGES GOOD ROADS SUPPORT

SAN FRANCISCO, CALIF., July 23—The saturation point in highways is a greater menace to the automotive industry than the saturation point in automobiles, according to B. E. Hutchison, vice-president and treasurer of the Chrysler Corp., who has been here on business. Failure of States, counties and cities to continue building and improvement of highways is the greatest danger to automobile manufacturers, distributors and dealers, Hutchison believes, and he suggests that the automotive industry should get solidly behind a nationwide movement for continuous construction of highways, both in communities and in rural districts.

REO ANNOUNCES VACATIONS

DETROIT, July 21—All departments of Reo Motor Car Co., except maintenance department, will be closed two weeks for vacations, despite heavy demands for production in bus plant. Much overtime moved factory executives to relent in their previous decision that no vacations would be taken. It is expected considerable repairing and overhauling will be done, as well as new equipment added in various departments during next two weeks. Sales thus far in July indicate 500 more Reo cars shipped than in entire month last year. Unfilled orders are heavier than any time since first of year.

Fisher Body Corp. Buys Fleetwood Co.

Policy of Famous Shops to Continue, Directed by Ernest Schebera

DETROIT, July 18—Purchase of the Fleetwood Metal Body Co., Fleetwood, Pa., by the Fisher Body Corp. is announced by W. A. Fisher, president of the latter organization. The shops will be maintained at Fleetwood under the direction of Ernst Schebera. The purchase brings about the retirement of Harry C. Urich who founded the company.

Except for minor changes, the policies of the Fleetwood company will be followed. It is believed that jobs calling for individuality to suit the taste as outlined by the purchaser will be completed here.

In purchasing the company, Mr. Fisher said that his company had but one object in view and that was to preserve one of the finest traditions of hand-craftsmanship to be found in the United States.

Propose Survey of Foreign Commercial Aviation

WASHINGTON, July 21—A comprehensive survey of commercial air lines abroad, including services offered, volume of traffic, safety, regularity, financial status and equipment, cost of operation, Government aid, landing fields, and distances and density of traffic, is immediately to be undertaken jointly by the Department of Commerce and the American Engineering Council.

The purpose is to provide both a fact-finding review of civil aviation as it is at this date and a basis for analyzing the economic and other conditions necessary for successful civil air routes in this country, according to Professor Joseph W. Roe, head of the Department of Industrial Engineering, New York University.

The work will be under the direction of a committee of six, of which J. Walter Drake, Assistant Secretary of Commerce, will be chairman, and Professor Roe, vice-chairman.

FAGEOL MOTORS CHANGE PRICE

OAKLAND, CALIF., July 22—Price changes in their line of trucks have been announced by the Fageol Motors Co. simultaneously with the bringing out of a new 1½ ton truck chassis. The price of the two-ton model has been increased from \$3,300 to \$3,750, while the 4 and 6 ton models have been cut \$150 and \$350 respectively, and now list at \$4,950 for the four ton and \$5,450 for the six ton model. The new one and a half ton truck lists at \$3,150.

Coming Events

SHOWS

Sept. 8-11—New Haven, Mason Laboratory, Yale University Machine Tool Exhibition, direction of Amer. Society of Mech. Eng., Chamber of Commerce and Yale Mechanical Engineering Department.

Sept. 14-19—Cleveland, Public Auditorium, Annual Convention and Exposition, American Society for Steel Treating, W. H. Elsemann, secretary.

Sept. 21-26—London, England, Annual Cycle and Motorcycle Show under auspices of the British Cycle and Motorcycle Manufacturers and Traders Union, Ltd.

Sept. 28-Oct. 3—Chicago, Fourteenth annual Safety Congress and Exhibit, Rainbow Room, Hotel Winton, under direction of National Safety Council, A. M. Smith, business manager.

Oct. 5-9—Atlantic City, Young's Million Dollar Pier, Manufacturers' Exhibition in connection with American Electric Railway Association Convention.

Oct. 8-17—London, Olympia passenger car show.

Oct. 29-Nov. 7—London, annual truck show.

Nov. 26-Dec. 6—Berlin, Germany, Annual Automobile Show in the Kaiserdamm.

CONVENTIONS

Sept. 14-19—Cleveland, Public Auditorium, Annual Convention and Exposition, American Society for Steel Treating.

Oct. 5-9—Atlantic City, Young's Million Dollar Pier, American Electric Railway Association.

Oct. 7-10—Montreal, Motor and Accessory Manufacturers Association Convention.

RACES

July 26—Paris, Montlhéry Track, French Grand Prix.

Sept. 7—Altoona, Pa.

Sept. 19—Syracuse, N. Y.

Sept. 30—Fresno, Cal.

Oct. 10—Baltimore-Washington Speedway, Laurel, Md.

Oct. 12—Salem, N. H.

Oct. 24—Charlotte, N. C.

Nov. 26—Los Angeles.

S.A.E. MEETINGS

National

Sept. 15-16—Cleveland, Production meeting and exhibition.

Nov. 12-13—Philadelphia, Automotive Transportation meeting.

Nov.—Service Engineering meeting.

THE UP AND DOWN OF GARAGES IN CHICAGO

CHICAGO, July 22—Skyscraper garages to solve Chicago's downtown parking problems may result from an opinion of Francis X. Busch, city attorney, legalizing construction of the Jewelers' Building, forty stories tall, as a combination garage and office building. Twenty-seven per cent of all floors up to and including the twenty-third will be devoted to car space.

One of Chicago's first underground garages will be built shortly by the Chicago & North Western Railway in the city block between Randolph and Washington Streets, and Canal and Clinton Streets, President Fred W. Sargent of the company announced today. The garage will have a storage capacity of 250 cars.

Kansas City Railways Order 61 Motor Buses

KANSAS CITY, MO., July 16—The Kansas City Railways Co. has placed orders for 61 motor buses, including both single and double-deck types, for operation over nine routes under a three-year ordinance recently approved by city council. Thirteen will be Macks, 23 Safeway Six Wheelers, 19 Model Z Yellow Coaches, and six Yellow Coach-General Electric gas-electrics.

All the buses will be equipped with Westinghouse automotive air brakes and a new steering wheel safety control developed by the Kansas City Railways to increase safety of operation. This control works in conjunction with the air brakes, causing the latter to apply if the driver removes his hands from the wheel while the vehicle is in motion. The control is also interlocked with pneumatic operation of both front and rear doors.

CHANGE STUDEBAKER RADIATOR

SOUTH BEND, July 22—All Studebaker models on the Standard Six chassis are now being equipped with a radiator shell of improved appearance. Earlier Standard editions carried a shell whose upper part, while of convex shape, had a somewhat flat appearance. The new shell, which is interchangeable with those of the former style, has a perfectly rounded contour and is very similar to the Big Six design, except that the fluting or scroll work is eliminated. A slight change has also been made in the shape of the side rear quarter windows on the duplex-phaetons.

ADD TO DIE CASTING PLANT

READING, PA., July 21—General Die Casting Co., recently incorporated in this city, has completed a new building which completes a third unit, giving the plant approximately 300,000 square feet of floor space. F. C. Morrison, vice-president and manager, was manager of the die casting division of the Light Manufacturing & Foundry Co., of Pottstown, for 12 years.

Will Hays Heads New Aerial Transport Group

WASHINGTON, July 22—Federal legislation to regulate and control air traffic will be drafted for presentation at the next session of Congress by a public relations committee headed by Will H. Hays. The committee has been appointed by National Air Transport, Inc., the recently organized \$10,000,000 commercial air service company.

Howard E. Coffin, president, in announcing the acceptance of Mr. Hays, said the proposal to operate a night air service between New York and Chicago this fall is "of a quasi public nature, inasmuch as commercial aviation development has an intimate relationship with our scheme for national defense."

PARKS BARRED TO NEW DRIVERS

BALTIMORE, July 21—Public parks here, under a rule adopted by the Board of Park Commissioners, have been ordered closed to persons learning to operate motor vehicles.

ISLE NEAR DETROIT STILL BARS MOTORS

DETROIT, July 21—Of all the civilized portions of the earth, there remains but one that is still immune to the automobile—a place where no automobile is allowed to travel.

This place is Mackinac Island, an overnight ride from Detroit and Chicago. Until this little island put forth its claim, it was thought that Bermuda was the last to surrender to the automobile.

Mackinac bars the motor car in the belief that this enhances its value as a health and pleasure resort.

This year the authorities permitted automobiles to be taken from one boat to another, 50 feet across the dock, but without power.

And Mackinac is a popular resort for captains of the automotive industry.

General Motors Acquires Patents of Gray-Hawley

DETROIT, July 23—General Motors Corp. has acquired exclusive patent rights from Gray-Hawley Manufacturing Co. for manufacture of pressed steel mufflers, heaters, exhaust and heating systems. This marks another step by General Motors Corp. toward controlling its sources of material.

All tools, dies, jigs, presses, fixtures and equipment will be moved to the A. C. Spark Plug plant, a General Motors unit in Flint. In addition to patent rights and machinery, General Motors has taken over all Gray-Hawley orders, contracts and commitments, and will continue furnishing mufflers and heaters to the outside trade as well as to General Motors Corp. units.

Gray-Hawley Manufacturing Co. plans to continue in business, operating on other patents in the manufacture of a standard drum type muffler, cutout valves and chassis parts.

AUTOMOTIVE INDUSTRIES

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The Time Sales Situation—

*What the Finance Companies,
Bankers and
Car Manufacturers*

Have to Say About It

Tendency exists among finance companies to blame one another for current troubles. Car manufacturers have vital interest in bettering present conditions.

By Norman G. Shidle

If difficulties arise in the retail field because of extension of too liberal terms in financing retail sales, the entire manufacturing end of the automotive industry—parts and accessory as well as vehicle builders—is going to help hold the bag.

The fact that finance companies are taking all the direct risks in most cases doesn't mean for a minute that they will be the only sufferers through unsound methods which they may apply in the heat of competition. The question concerns the car and truck manufacturers just as much as it does the finance companies and banks.

Present time sales troubles can't be ironed out without a firm application of good common sense all along the line. A

NEXT WEEK—

*The Automobile Insurance
Situation*

DEVELOPMENTS in automobile fire and theft insurance have been fast and numerous for the last two months.

The National Automobile Chamber of Commerce has appointed a committee to look into the possibility of car manufacturers forming an independent insurance company for the purpose of writing insurance at lower rates than those now available; Chrysler Corporation has put into operation a new insurance plan; the General Exchange Insurance Co., recently formed by General Motors Corp., has filed with the New York State Insurance Department rates about 25 per cent lower than those fixed by the insurance underwriters' conference.

What will be the next move?

John C. Gourlie, news editor, Chilton Class Journal Co., has made a complete investigation of the insurance situation and will present his conclusions in an article which will appear in *Automotive Industries*, August 6.

strong tendency exists just now for every element involved in the situation to blame every other one for the loose practices which it is generally agreed exist in many parts of the country.

Keenness of competition is not the only rock in the finance company river. It's the biggest rock to be sure, but surrounding it are suspicion, dislike, recriminations, charges and counter-charges which might leave the uninitiated investigator with the idea that few honest men were engaged in the business of financing automobiles today. Some of the car manufacturers are inclined to blame the finance companies for the terms which they are extending, and some of the finance

companies blame the car builders for laxity in selection of dealers, saying that many dealers are taken on who have little financial and no moral responsibility. Within their own ranks the finance companies, unfortunately, are having bitter as well as keen rivalry.

Some of the larger organizations claim that they are being forced to unusually small down-payments and exceptionally long credit terms by the competition of small "wildcat" companies which do not understand the business, have little service to offer and simply are giving all kinds of terms in an effort to get business at any cost.

Hundreds of smaller companies counter with the statement that they are trying hard to do business on a sound conservative basis, but that they are being forced into unsound practices by the excessively liberal terms being granted by the big companies, whom they accuse of trying to run them out of business by this method.

Agreement on Sound Terms

There is a pretty general agreement among finance companies, banks and car manufacturers that the automobile business would be better off if maximum terms were limited to 33 1/3 per cent down-payments and twelve months to pay. Actual experience in various cases, of course, show that a longer term for payment can reasonably be extended in a good many instances and that various modifications of the one-third down and twelve months principle can be made under proper conditions without materially increasing the risk. But the one-third down and twelve months to pay principle still seems to be the rallying point for the conservative propagandists.

And the term "conservative propagandists" can be interpreted to include a very large percentage of finance companies and automotive executives, if the numerous statements received by AUTOMOTIVE INDUSTRIES within the last three weeks are to be taken at their face value. As a result of the article "Concern Felt Over Growing Liberality of Time Sales Terms," published in our July 7 issue, scores of letters from every part of the country have come in commenting on the present time sales situation.

With only a few exceptions the general tenor of these letters is the same. It runs something like this:

"The time sales terms now being extended in many places are not sound. We are strongly in favor of conservative credit extensions, but are being forced into practices which we don't believe are sound through the competition of other companies."

That same idea runs through letters from big companies and little ones; through letters from Alabama, from Maine, from the Middle West and from the Pacific Coast. Everybody is in favor of doing business on a sound basis, but nobody can do it because everybody else insists on violating the rules of common business sense. Almost sounds like a jabberwocky, doesn't it?

Nevertheless, that's how things stand today. The cry in the automobile retail financing field is practically the same as is heard in every other line of business when competition becomes extremely strong. In the tire field, in the motorcycle field and in others which we have investigated at times when trouble was rampant, the situation was just about the same—and the remedy as well.

What's the remedy? Well, it's nothing that can be taken in a tea spoon and swallowed at one dose. It's the old formula that has cured so many economic ills in the past, but which always is so difficult to get a majority of the patients to take at once—constructive action, rather than destructive yowling; sinking of a few immediate reachings for gain into the well of cooperation and leav-

ing them there long enough to make possible the pulling out of sound conditions at some future date.

The chance of doing something like this in the present case seems to be a good bit better than usual, because a large number of the finance companies already have got together and formed an association for the promulgation of sound principles. It is the falling away from those principles, of course, that has caused much of the bitterness—and not a little cynicism—on the part of those who originally subscribed to them. Nevertheless, further effort along similar lines seems to be one of the best and quickest ways to make progress under present conditions. Maximum progress, of course, never can be hoped for until cooperative effort has been carried sufficiently far to generate in the various participants a reasonable degree of confidence in the honesty of purpose of the others.

Opinion on the various problems involved in the financing of retail sales of automobiles differs, of course, in many details, while shades of opinion on any given topic run all the way from white to black. From the scores of letters received a reasonably fair picture of the situation may be painted. Some of the broader aspects already have been outlined. Quotations from a few of the letters will help to define the consensus of thought on other points.

Five main topics appear from an analysis of the letters which have come in:

1. Where does the manufacturer come in?
2. Is the finance company in the automobile business and the automobile dealer merely a credit salesman?
3. Are car manufacturers sufficiently careful in choosing their dealers?
4. Current finance



company competition—what will be the future reaction?

5. "One-third down and twelve months to pay"—principle or fetish?

Probably nobody is better qualified to say "where the manufacturer comes in" than is Charles W. Nash. And here is what he writes:

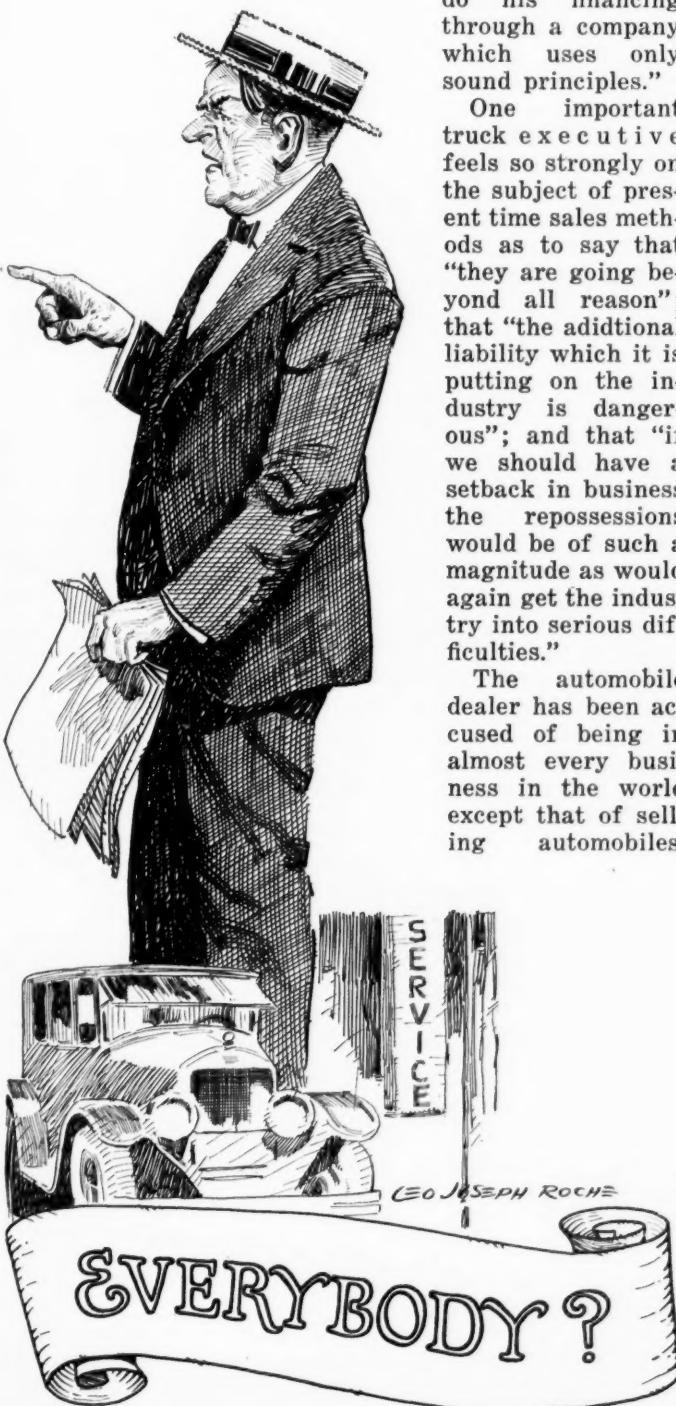
"There is no question but that the manufacturer is more deeply interested in the question of time sales than anyone else, and I agree with you thoroughly that there has been and is today some very unsound practice being carried on in the financing of automobiles.

"The job of every manufacturer should be to create stronger and better dealers, and while there may be some temporary gain by financing with some company which uses unsound practices, in the long run the dealer will be

much better off to do his financing through a company which uses only sound principles."

One important truck executive feels so strongly on the subject of present time sales methods as to say that "they are going beyond all reason"; that "the additional liability which it is putting on the industry is dangerous"; and that "if we should have a setback in business the repossessions would be of such a magnitude as would again get the industry into serious difficulties."

The automobile dealer has been accused of being in almost every business in the world except that of selling automobiles.



There was a time when car makers didn't want him to sell accessories for fear that he would get in the equipment business and neglect to invest enough in car stocks; it has been said that the dealer in many cases really is a purchasing agent engaged in buying used cars; that he is primarily in the used car business; and now that he really is a credit salesman and not a motor car merchant.

Seriously as we regard the time sales question, we always get a laugh out of the people who see the automobile dealer as everything except what he is. If they are right, the automobile dealer is a far more able citizen than most people credit him with being, because in addition to these multifarious avocations attributed to him he has found time to get into the hands of the public well in excess of 20,000,000 motor vehicles in the last 20 years—which isn't so bad as a side line.

Pacific Coast Conditions

There is some basis for the statements made along this line in certain instances, but the general situation isn't really so bad for the country as a whole as one Pacific Coast finance company indicates in the statement that "the present so-called automobile financing is not financing; it has long since passed out of that class. It means simply that the finance company is in the automobile business and the dealer is an automobile salesman." Nevertheless, some dealers do seem willing to shift as much responsibility to the shoulders of a finance company as possible, with the mistaken idea that credits are no concern of theirs so long as they don't indorse any notes.

About the present methods of competition and the possibilities of a future reaction, there is no lack of opinion—opinion both definite and strong. A few examples will suffice to indicate the general tone. One finance executive from Indiana says that there is no question in his mind but that some of the automobile finance companies are running wild. "There are a great many things going on in the Middle West," he continues, "which should be curbed, but after all it probably will be a survival of the fittest."

The increase in 15 and 18 month paper and the practice of finance companies giving rebates to dealers out of finance charges is viewed with regret by a Pittsburgh executive who believes that these methods "not only will cause disaster to the finance companies using them, but also to the credit standing of other companies wishing to do business along stabilized lines."

A Pacific Coast opinion from the head of a \$1,500,000 company includes this striking statement:

"If our own business were conducted on the basis that has been adopted by a number of companies, we should want to change our letter heads to read 'Automobile Gambling' instead of 'Automobile Financing.'" Presentation of the facts won't do much good, according to this correspondent, because the finance companies already know them and such facts probably wouldn't "change the growing tendency toward general demoralization."

This idea is supported by the president of an organization of similar size in Indianapolis who states that "The time payment business as conducted by a number of houses at present can, in our opinion, lead to only one result, and that is disaster." From North Carolina comes another statement of the same tenor, saying "We feel that the growing liberality of time sales terms will react to anyone interested in the automobile business, from the manufacturer down to the consumer."

Part of the losses involved in financing retail sales comes, of course, through that relatively small section of car dealers who do not fully assume the moral and ethical responsibilities which properly go with their function as

merchants in a sound, stable industry. Some of the finance companies are inclined to blame the manufacturers for enrolling men of this type as members of their retail organizations. Manufacturers are heartily in accord with the idea that men of this kind aren't good for the business and are weeding them out as rapidly as possible. The perfect organization hasn't been made yet and scarcely can be expected. Certain it is, however, that every car maker in the business is interested on his own account in having as dealers only such men as will bring credit on his organization. And, by and large, he has achieved remarkable success in building organizations of that kind.

Suggestions for greater care in selection of dealers have been made in several of the letters commenting on the time sales question. One Illinois finance company president, for example, writes his belief that "much of the so-called 'wildcat' operations can be curbed by the manufacturers, not alone by regulating their production in accordance with the demand for their product, but also by cleaning house among their dealers and selecting only dealers with character and such as have proved themselves to be good merchants."

"Serious consideration should be given by manufacturers to the dealer question," writes another Middle Western executive. "In our opinion there are too many manufacturers ready to contract with any kind of a dealer in order to get rid of their product, no consideration whatsoever being given to stabilize the business and put it on a firm foundation."

Better Dealers Sought

There are so many reasons, exclusive of the effect on financing, making it beneficial and desirable for the manufacturer to choose his dealers with care, that there is little doubt that efforts to improve dealer organizations will be pushed ahead as rapidly as possible. The financing problem just gives a little more impetus to the movement.

Gaining widespread prominence as a part of the recommendations of the newly formed National Association of Finance Companies last winter, the "one-third down and payment within twelve months" policy finally has become the rallying point of those standing against more liberal terms, a thorn in the side of some quite conservative finance men whose experiences indicate that safety can be obtained on other bases as well, and a joke in many quarters where it has long since been abandoned as a standard of practice.

To a few the slogan has become something of a fetish. But to most students of the problem it represents simply the expressions of a general compromise opinion as to the most liberal terms that can be granted with safety under present conditions. As with any other compromise or general expression, sound reasons for exception are almost certain to exist. And despite the overwhelming opinion in favor of maintenance of this principle if possible, it would be unwise for the unbiased student of the situation to regard it as the last word in sound time sales terms. The last word has been spoken so often in the past that wise economists will hesitate to speak it again just as this moment. The very striking changes which have come about in the method of paying for automobiles bought at retail was remarked only the other day by an executive who has been closely associated with the industry since the beginning of the century.

"It may be that one-third down and payment in 12 months constitutes the maximum terms consistent with safety today," he said, "but when I look back on the ideas and practices that have evolved in the last 25 years, I cannot help but feel that our present situation may constitute only another passing phase."

"Cash with delivery once was the accepted payment method. When time sales first began, what a rumpus was started in some quarters! A good many men in the industry were sure that the business had started for perdition and that only a miracle could save it. Selling automobiles on time! The very idea! Why, it can't be . . . etc.!"

"But automobiles were sold on time successfully. Today everybody recognizes that the principle of time payment is perfectly sound and that it was upon this basis that quantity production of motor cars was developed. And ever since time payments began changes have taken place in methods and practices.

"That doesn't mean that I'm trying to defend all of the things that are going on today. Far from it. It does mean, however, that one shouldn't be too didactic about what can and what cannot be done successfully. The impossible has been done too often. The pioneer always is called crazy for a while. Sound business practices certainly will prevail in the long run, but a thing can't properly be called unsound simply because it hasn't been tried before. The conservative of today is often the radical of yesterday."

Typical views from finance company men as regards the one-third down and payment in twelve months principle show that opinions vary in emphasis but for the most part point in the same direction. Here are a few of the more interesting:

"We look with considerable doubt and suspicion on the soundness of any automobile financing more liberal than one-third down, balance in 12 equal monthly installments."—Kentucky.

"We are making every effort to confine terms within the 12 months' limit and feel that in the long run this would be the most satisfactory policy for everyone concerned."—Michigan.

"It is with regret that we find such irregularities as 15 and 18 month paper creeping into the business."—Pennsylvania.

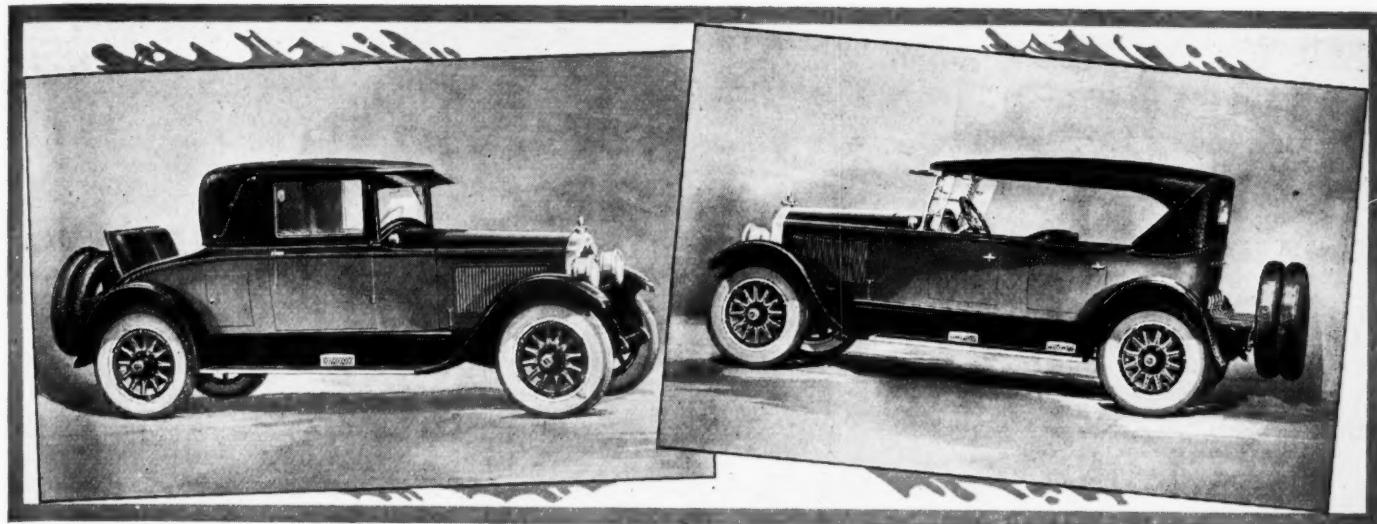
"If the dealers permit cars to be bought for less than 30 per cent to 40 per cent down, they are going to kill their used car market beyond all question."—Illinois.

"Our experience strongly corroborates the soundness of this principle, but we have tried some experiments with deferred payments extending beyond the 12 months' period and they have been extremely satisfactory. Nevertheless, we are not at all eager to encourage anything beyond 12 months' paper."—Canada.

"If it were possible, which of course it is not, to make it a criminal offense for any finance company to accept automobile paper with terms other than one-third cash and the balance in 12 months, it would be the best thing for the automobile industry as well as for the finance companies in general."

Because of the widespread falling away from the principles set up by the National Association of Finance Companies, even among those organizations which pledged themselves to their support, the feeling has arisen in some quarters that the attempt to better conditions through cooperative effort has failed in its purpose.

To some extent that may be true. But the fact should be recognized that at least there is available an established agency through which is possible an orderly adjustment of mutual difficulties. If that agency be strengthened and fully utilized it may be a strong force for good.



Buick Master Six "Country Club" 3-passenger model

Buick Master Six 4-passenger touring

Buick Announces 1926 Line and Cuts Prices \$25 to \$730

Cylinder bore increased on both Standard and Master models.

Oil filter, air cleaner and gasoline strainer now are regular equipment. Braking system revised.

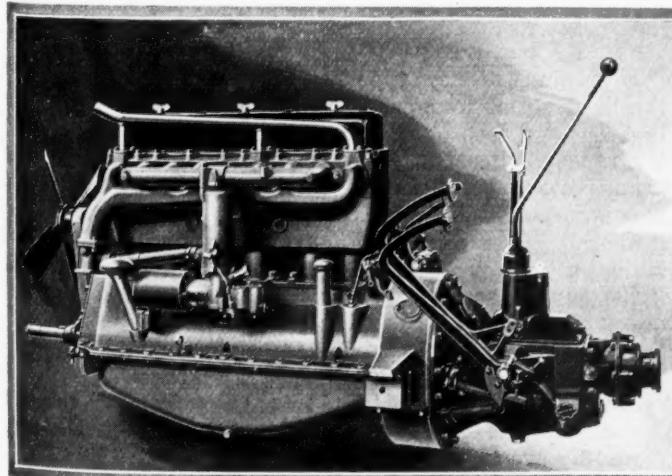
By L. S. Gillette

RETAINING the essential features which have characterized the Buick cars of late, the 1926 Standard and Master Six models, in addition to marked changes in general appearance, embody many mechanical refinements.

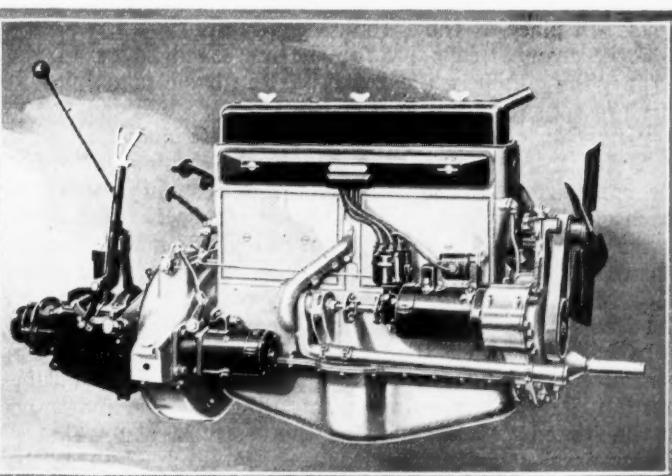
Concurrent with the introduction of the new series, prices have been reduced on all models. The decreases are from \$25 to \$370 on the Standard Six and from \$100 to \$730 on the Master Six.

Sixteen body models having new color schemes and having moldings extending from the altered design radiator entirely around the body comprise the new line.

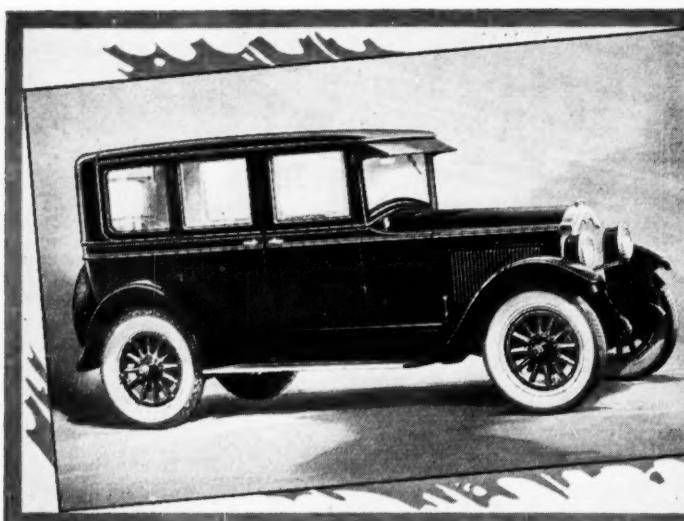
As compared with the previous models, the price differential now existing between the regular touring and the four-door sedan is \$145 instead of \$490 on the Standard Six chassis, \$200 instead of \$830 on the 120 in. Master chassis and \$400 instead of \$625 on the 128 in. Master Six chassis. The prices are:



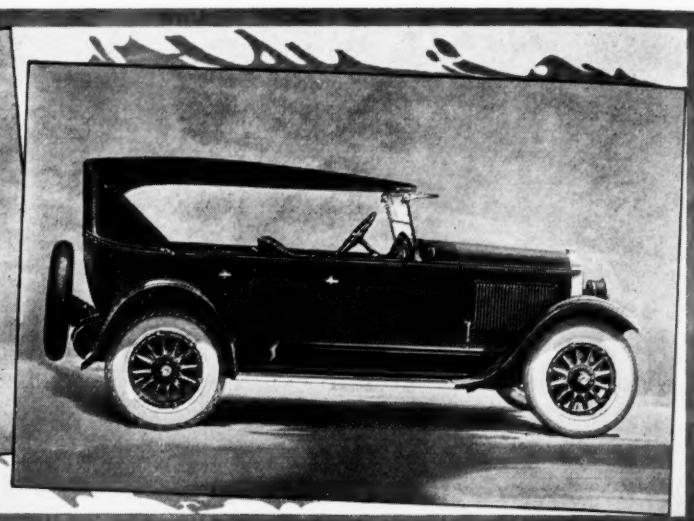
Left side of unit powerplant, giving view of manifold and AC air cleaner



Right side of Buick engine, showing new Delco two-unit electrical equipment



Buick Standard Six 5-passenger sedan



Buick Standard Six 5-passenger touring

Standard Six

No. 24—2-pass. roadster	\$1,125
No. 25—5-pass. touring	1,150
No. 20—5-pass sedan 2-door.....	1,195
No. 26—2-pass. coupe	1,195
No. 28—4-pass. coupe	1,275
No. 27—5-pass. sedan 4-door.....	1,295

Master Six, 120-In. Wheelbase

No. 44—2-pass. roadster	1,250
No. 45—5-pass. touring	1,295
No. 40—5-pass. sedan 2-door.....	1,395
No. 47—5-pass. sedan 4-door.....	1,495

Master Six, 128-In. Wheelbase

No. 54—4-pass. sp. roadster.....	1,495
No. 55—5-pass. sp. touring.....	1,525
No. 54C—3-5-pass. country c. coupe.	1,765
No. 48—4-pass. coupe	1,795
No. 51—5-pass. brougham sedan.....	1,925
No. 50—7-pass. sedan	1,995

Chief among the mechanical changes on the engine and chassis of both models are the increasing of the cylinder bores by $\frac{1}{8}$ in., so that the Standard Six now measures $3\frac{1}{8}$ in. in diameter and the Master Six $3\frac{1}{2}$ in.; the fitting of an oil filter, air cleaner and gasoline strainer, and the adoption of an improved Delco two-unit electrical system in place of the former single unit type.

To give ample capacity for the increased power of the engine, the clutch, while retaining the basic principles of the previous type, has been entirely redesigned. The transmission case has been made more rigid and all gear teeth increased in width, while several changes affecting the axle sizes, bearing dimensions and spring seats are made on the rear axles. In addition to slight refinements in the four-wheel braking system to provide more effective braking with lighter pedal pressure, larger section tires, 31 by 5.25 in. on the Standard Six and 33 by 6.00 in. on the Master Six chassis, are provided.

In harmony with the improvements made in the appearance of the bodies, the radiator shell, while maintaining the characteristic Buick design, has been rounded out in the front by $\frac{1}{2}$ in., allowing the use of larger radius at the corners. Greater length has been emphasized at the front of all cars by pressing the bead into the shroud and finishing both in the same color. Formerly a strip of aluminum beading marked the joining of the hood with

the cowling. The Duco finish is in new colors with suitable striping and black molding. On the Master Six chassis two of the closed models and both sport cars are in two-tone effect, the latter two being offered with two color options at no additional cost.

With the exception of both sport models on the Master Six chassis, all open cars are now provided with permanent tops having a strip extending along the inside edge which allows closer fitting of the side curtains and the installation of winter inclosures, the latter being available at extra cost.

Straighter roof lines and smaller radii used at the rear corners identify the Fisher closed cars. On the Master Six models the height of the roofs has been lowered by $1\frac{1}{8}$ in., although there has been no reduction in the amount of headroom. In addition to the "VV" type windshields having an improved rubber water seal and increased width of the rear windows, all bodies on both chassis are fitted with the remote type of door latch control, the operating handle being located several inches below the glass and in approximately the center of the door. The door pull fittings are integral with the garnish moldings, while exterior bar type door handles of new design and more easily operated are employed. A special feature on the coupe and roadster models is the spring hinges which open the rear deck when the key is turned, the latter also fitting the transmission lock and, on the closed models, the doors.

New Type Headlamps

Headlamps of new type permit raising or lowering of the light beams for general or traffic driving and are controlled by a lever at the center of the steering wheel. Bulbs employing two filaments, each being of the same candlepower, special lenses and reflectors are used in the new lamps. Although the bulbs are so designed that they cannot be assembled in the wrong manner in the headlamps, a regular standard bulb providing only "bright" light may be used if bulbs of the two-filament type are not available for replacement. To eliminate the necessity for left and right headlamps and to simplify adjustments, the lamps are mounted at the center of their base on the reinforced channel extending across the front of the car. An outside focusing device and improvements in the door mounting are included in the new lamps.

Enlarging the cylinder bores by $\frac{1}{8}$ in. and improved carburetion has increased the horsepower from 51 to 60 at 2800 r.p.m. on the Standard Six engine and from 65 to

76, also at 2800 r.p.m., on the Master Six, while the maximum torque of the smaller engine is now 141 ft.-lb. instead of 120 and on the larger powerplant is 179 ft.-lb. instead of 160.

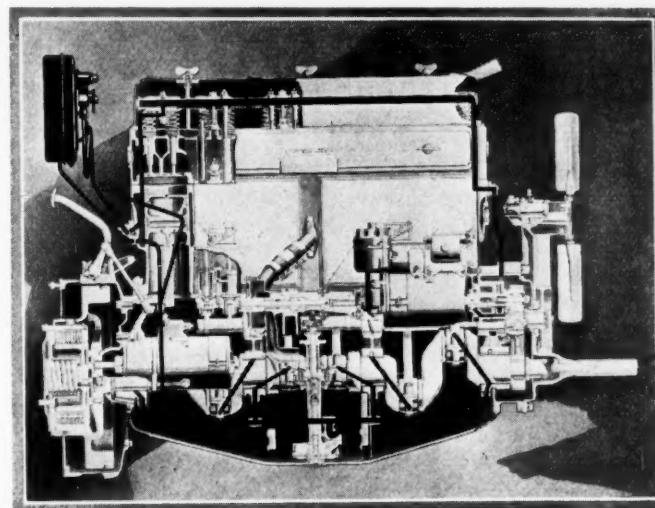
As the water pump no longer has to drive the former single unit type electrical system, a smaller casehardened shaft, ground to reduce wear, is used, while one packing gland only is now necessary. Driven through two universal joints from the end of the generator, the pump is mounted on a rigid bracket integral with the upper half of the crankcase.

Changes in Valve Mechanism

Providing oil grooves to the outside diameter of the valve lifters which feed lubricant through an oil hole in the wall of the lifter, increasing the width of the valve rollers from $\frac{3}{8}$ to $\frac{7}{16}$ in., and use of a small radius on the corner of the roller, addition of four solid coils at the bottom of the valve springs and casehardening of the rocker arm shafts have insured longer life of the valve mechanism. Made of 25 per cent heavier stock so as to provide greater rigidity and thereby prevent oil leaks, the push rod covers are provided with copper-asbestos washers under the cover screws as a further guard against possible oil leakage. To provide sufficient cooling for the larger engines, the fan on the Standard Six has been increased in diameter from 16 in. to 17 in. On the Master model the fan blades are considerably wider, while to provide better ventilation the engine side pans have been made deeper at the rear. In line with these changes, the diameters of the exhaust pipes on both models are increased in diameter, the pipe of the smaller engine now being 2 in. and the larger $2\frac{1}{4}$ in., while the inner tubes of the mufflers are made in one piece and with one seam for greater strength.

Virtually everything has been done to prevent foreign matter entering the engines from any source and several thousands of miles are claimed to be added to the life of the engines by the fitting of an oil filter, air cleaner and gasoline strainer. Mounted on the dash above the right

automatically direct the oil to the rocker arm bearings under this condition. A pet cock is provided to show when the oil flow indicates the interior of the filter should be replaced with a new filtering cartridge, the latter being obtainable at nominal cost. A centrifugal type air cleaner having no wearing parts and fitted with a small detachable dust container is connected directly with the carburetor. Provided with a detachable glass bowl making

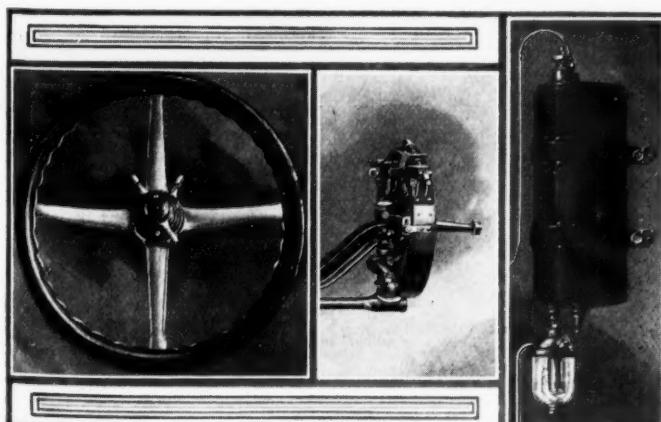


Buick oil circulating system showing installation of the oil filter

the water and dirt accumulation plainly visible, the fuel passes through a metallic screen in the gasoline strainer which is placed directly below the vacuum tank, between it and the carburetor. To provide more positive lubrication and to assist in the filtration, the Standard Six oil pump has been changed to provide increased pressure. Pipes from the main bearings are enlarged in diameter from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. and the relief valve altered to the same design as that on the Master model.

Coinciding with the design of the smaller engine, the upper half of the crankcase on the Master Six has been changed from aluminum to cast iron and a separate detachable flywheel housing having the engine arms cast integral is employed on the new model. This design allows more rigid support for the crankshaft and makes for easier servicing.

On both models new calibration of the carburetors and several changes in the dimensions of the interior passages, valves and jets have been made, while minor alterations are incorporated in the heat damper and dash pot plunger. To allow better installation of the air cleaner, the heat outlet from the carburetor is now located in the lower part of the riser body, making it unnecessary to disturb the heat pipe when removing the carburetor from the riser. On the larger engine the diameter of the intake manifold has been increased from $1\frac{3}{8}$ to $1\frac{7}{16}$ in.



Left—Light dimming control as now mounted on Buick steering wheel. Center—Minor changes have been made in brake band layout. Right—Installation of gasoline filter on vacuum tank of the Buick

side of the engine, the oil filter consists of filtering cloths and metal screens carried inside a metal case, and at car speeds of over 20 m.p.h. all the oil in the crankcase is cleaned every five minutes. Taken from the oil system at the rear of the engine, the lubricant passes through the filter to the rocker arm bearings.

The possible clogging of the filter will in no way interfere with the regular oiling system, as a by-pass will

Delco Electrical System

Supplanting the single unit type generator-starter which has been a Buick feature for over ten years, the new models are equipped with a specially developed two-unit Delco electrical system. Starters on both models are interchangeable, as are the generators, the former being located in an accessible position on the right side of the engine and the latter being driven by the timing gears and mounted on the same side as the starter.

The starting motor, known by model designation No. 316, is of the positive mechanical type. Pressing down on the starter pedal, which is mounted on the top of the fly-

wheel housing, pushes the gears into mesh with the teeth on the flywheel before the current is introduced. After the gears are in mesh a contact is formed with the switch on the starting motor, this completing the circuit and providing a fast cranking of the engine and a quick break-away torque. An over-running clutch in the starting gear assembly allows the motor to run ahead when the engine starts.

Cut on a steel ring which is shrunk on the flywheel and secured by dowel pins, the teeth on the starter flywheel gear are chamfered for easy and silent engagement. To allow for easy service work in the event of the starter teeth being damaged, it is possible to pry the old ring gear off the flywheel after the dowel pins have been drilled out. Incorporating simplified leverages, the starting pinion can in an emergency be pulled back out of mesh with the flywheel in the event of a jam by pulling backwards on the starter pedal, thus freeing the pinion from the gear.

Redesigned Clutch

Smaller and lighter in weight than used on previous models, the generator carries the ignition distributor directly over the rear armature bearing. The weatherproof distributor coil and the cut-out relay also are carried on the top of the generator where they are in an extremely accessible position. Brush mountings have been improved to eliminate squeaks and the commutator and brushes have been designed so as to have much longer life. The model designation of the generator is No. 317, while the combination switch on the Standard Six is known as No. 1259 and the Master switch No. 1288.

Insuring better balance, smoother operation and longer life for the wearing parts, the multiple dry disk clutch has been entirely redesigned and is carried in a special flange on the flywheel itself. In place of a bronze bushing, a New Departure ball bearing packed in grease and sealed and located in the rear end of the crankshaft now carries the forward end of the clutch shaft, helping in the alignment and fitting of the clutch shaft. Driven through the teeth cut in the outer diameter which mesh with teeth cut in a special flange on the flywheel, the drive disks provide over 200 per cent more wearing surface at this point than on previous models. The driven disks, being made from special high carbon steel, have the teeth cut on the inner diameter and, working with the teeth on the clutch hub, give considerably more wearing surface than before. Clutches on both models employ ten facings developed of special material and having larger outside diameter and wider face to give longer life. On the smaller car these facings are $\frac{1}{8}$ in. thick and on the larger edition $\frac{5}{32}$ in. thick. Made of heat treated high carbon steel, the clutch hub is splined for both the clutch shaft and for the driven disks. The rear clutch plate and release spring carrier are now made of one piece to prevent oil leakage into the clutch.

Transmission Made Stronger

Bolted to the flywheel housing, the transmission case has been made more rigid and the hand inspection hole reduced in size to increase the strength of the unit. By using different steel and heat treatment, the transmission gears are increased in hardness and toughness, and by widening the face of the gears strength and longer wearing surface has been added. An oil baffle cast in the transmission case cover eliminates the possibility of oil leaking past the control lever opening. Offsetting the hand brake lever forward and raising the control lever ball to a more accessible position allows the right forward seat on the two-door sedans to be folded all the way forward. The clutch pedal is 1 in. longer than before.

Considerable difference exists in the changes which have been made on the rear axles of the two cars. The axle shafts on the three-quarter floating Standard Six axle have been increased in diameter for strength, while the inner ends of these shafts are splined instead of square to insure a better fit between the shaft and differential side gear. To reduce the tendency to whip at high speed the long portion of the pinion shaft has been increased in diameter, while the size and capacity of the bearings carrying this shaft have also correspondingly been increased.

New Departure single row type bearings replace the former double row bearings carrying the real wheels on the Master Six full floating rear axles. On the 120 in. wheelbase chassis only the differential bearings have been increased in size, corresponding with those employed on the 128 in. chassis. The pinion bearing is also larger. Although the dimensions of the axle shafts remain unchanged, additional strength has been secured by forming the shafts of manganese instead of carbon steel, previously employed.

Common to both axles, the spring seats are changed to use a drop forged hardened steel thrust block providing two and one-half times more wearing surface on either side. Grit and dirt have been eliminated from this point by grinding the contact surfaces, enabling a closer fit to be made and insuring longer life thereby. For convenience in raising the rear wheel from the ground, the jack rest construction has been altered to allow a greater purchase and eliminate the possibility of the jack slipping.

Changed Brake Mechanism

Four-wheel external contracting brakes are the same design and principle as used on the previous models except that the operating mechanism at the bands is reversed. This arrangement gives more effective braking with lighter pedal pressure and allows one long piece of brake lining to be used on each drum. Due to the fulcrum of the brake operating mechanism now being at the long end of the band, the latter moves in the same direction as the drum while the car is traveling ahead and the brake pedal is operated. This increases the efficiency of the brakes, as the rotation of the drum helps to set the brakes, making them easier to operate and reducing the tendency to squeal. With this design the wear on the facings is the same at the brake anchor as at the ends of the band, and filling in the space with brake lining under the anchor clips has added 41 sq. in. of extra braking surface. One brake lever pin instead of two is used in the operating brake lever at the brake end, while the adjustment for the band clearance is simplified. By using a nut at either end of the brake band, each nut controls the clearance for its end of the band independently of the other end.

Shields fastened to the brake drum disks with screws cover the inner edge of the brake drums and bands, preventing water and dirt thrown up from the wheels entering between the lining and the drum. Another shield performing similar duty is part of the band clips and covers the space between the end of the bands. Hexagon head brass cap screws at the brake anchor add greatly to the ease in making adjustments. The outer universal joints on the front brakes are now covered with leather boots to keep the dirt out and the grease in.

Tubular Cross Brace at Front End

To increase the frame stiffness at the forward end of the Standard Six chassis, a tubular cross brace is used in place of the "U" section member at that point. Body brackets are added to the sides of the frames and are located under the main sills of the closed bodies on both chassis. This design allows better support for the bodies

and makes the hold down bolts more accessible.

Easier steering on the Master Six has been achieved by adding 7 per cent to the steering gear reduction, the rolls on the yoke shaft having been moved further apart, while on the smaller car the diameter of the wheel has been enlarged from 17 in. to 17½ in. On both steering gears a heavier wall is provided under the worm on the steering tube, while the steering worm key is integral with the worm instead of a separate part used to lock the worm to the tube.

Wheels Are Altered

Special bosses for centering the rims on the new 21 in. wider spoked wheels are provided, which, in connection with the new special type rim wedges, provide a better support for the rim on the wheel and insures very rigid and positive mounting. On the Standard Six model the hub flange and bolt circle are larger in diameter by ¼ in., with the hub caps larger in size to correspond with the new hub flanges.

All body models on the Standard Six chassis are finished in Buick gray with red striping, while the upper portion of the closed bodies is in black Duco. Both open models are upholstered in genuine long grain bright finish leather, having the door, cowl coverings, etc., finished in a material to match. A special pattern high grade taupe plush is used for the seats and backs and a plain plush of the same quality and color is employed for the body sides and headlining on the closed models. In the rear compartments of the two sedans and on the four-passenger coupe the floor covering consists of a newly developed hair and wool rubber-backed carpet, neatly bound and held in place by fasteners. Doors on the two-door sedan are 2 in. wider, while the front seats have the outer corners rounded, giving more clearance between the seat and door posts. The backs of the seats extend lower, reducing the space between the back and the seat cushion. A feature on the two-passenger coupe is the shelf at the back of the seat, which is lower than the top of the seat back to assist holding articles carried on the shelf in place. The rear deck of the four-passenger coupe has been modified to give a more streamline effect while providing ample room for baggage in the compartment, which is fitted with a waterproof flush-type door.

Color Schemes and Upholstery

Color schemes on the Master Six are similar in many respects to those on the smaller car. Both five-passenger sedans and the two regular open models are finished the same as the Standard line. The four-passenger coupe and the seven-passenger sedan are done in lotus blue with striping to match, while the brougham sedan and country club coupe are finished in two-tone effect, employing Texas brown below the molding and light Texas brown above. The two open sport models are offered with two duo-color options, the first being two-tone Buick blue with natural wheels and the second Texas brown with wheels to match. With the exception of the two five-passenger sedans, which are upholstered in the same manner as the Standard Six bodies, all closed cars are finished in the interior with a rich mohair plush in color to match the exterior. To assist passengers rising from the seats, braided ropes are included in the interior furnishings on the seven-passenger sedan and the four-passenger coupe. Floor covering on all closed models is the same as that employed on the Standard Six line.

On the two sport cars the collapsible top is carried in nickel plated brackets which are used when the top is down. These brackets are carried loose in the cars and when in use are inserted in holes at the top and back of the outer end of the seat frame. To facilitate communica-

cation with the passengers in the dicky seat, the center section of the rear back curtain can be raised on the roadster model. Both cars are upholstered in two-tone Spanish leather harmonizing with the exterior finish. Headlamps and side lamps are full nickel plated on these models, as are the bars and fastenings of the two-piece type windshield. Windshields of beveled plate glass using nickled fastenings are also included.

Vidal Designs New Engine

A NEW high efficiency engine embodying some of the features which are at present encountered chiefly on aircraft engines has been designed by C. H. Vidal and A. H. Caple and will shortly be manufactured in quantity by the Vidal Engineering Co. of Croydon, England. It is intended mainly for use on high-grade sport cars.

Some of the features which contribute to the efficiency of this engine are the double sets of valves and spark plugs per cylinder. Whereas the N. A. C. C. horsepower rating of this engine is but 10 hp., the bore being only 2½ in., the engine is capable of developing 60 hp., as was shown in a recent test using a Froude brake. This means the unusually high power output of 1 hp. for every 1½ cu. in. The double sets of valves are actuated by single rockers equipped with tappet-clearance adjusting devices, each rocker being removable without removing other rockers. A single finger on each rocker resting on a cam of the single camshaft actuates both valves on either intake or exhaust. The camshaft, which is driven by a chain at the front end, is provided with a vernier coupling which permits of very fine adjustments of valve timing. A separate distributor is used for each set of four spark plugs, the distributors being driven through a cross shaft from the end of the camhaft.

The exhaust manifold is of a rather unusual design in that the exhaust gases are carried forward to an exhaust pipe behind the radiator.

Every effort has been made to reduce weight in the engine. Tulip shaped valves are used, as are aluminum alloy pistons of a special design. The three-point mounting of the engine is also rather unusual in that the odd support is at the rear of the engine instead of at the front as in conventional designs. The crankcase breather exhausts under this support and, as a result, the power unit can pivot slightly on its rear support, free working being insured by the oil vapor.

The first engine has just been put through a 10,000 mile road test in a specially designed four-passenger touring car. A maximum speed of 75 m.p.h. was obtained.

WHILE the dimensions of engine cylinders in the automotive line are constantly decreasing, in another field of application of the internal combustion engine, the motor ship, they are going up. Word comes from abroad that the largest motor freighter ever built was launched recently at the Deutsche Werft for a firm in Gothenburg, Sweden. It carries two eight cylinder Diesel engines of 3300 hp., built by Burmeister & Wain of Copenhagen, Denmark. The cylinders are of 29 in. bore and the piston stroke is 47½ in. or substantially 4 ft.

Two pair of very much larger engines are being built at the Stabilimento Tecnico of Trieste, Italy, to Burmeister & Wain design. These are eight cylinder, four cycle, double acting engines of a combined output for the pair of 24,000 hp., but the cylinder dimensions are not given. These engines will propel two Transatlantic passenger liners of 26,000 gross tonnage and capable of carrying 3000 persons, including the crew, in addition to 9000 tons of cargo. They will be the largest motor passenger ships in the world.

States Building Most Roads Are Most Prosperous

Extent of highway development shown by fact
that 40 per cent of all State bonds
are used for this purpose.

AT the close of 1924, 40 per cent of the total outstanding debts of the 48 States of the Union had been incurred for the construction of highways and bridges, an increase of nearly 7 per cent since 1922. In 1922 the total debt for highway construction was \$367,687,100 and at the end of 1924 this sum had increased to \$626,852,350. These figures are given in a report on State indebtedness recently issued by the Bank of America.

Despite the increase in highway bonds, however, 23 States have no bonded indebtedness for highway construction, which means that in these States highways are being built with current funds, by county and township bonds or are not being constructed.

New York leads the country in value of outstanding bonds for this purpose with a debt of \$98,800,000. California is second with \$66,825,000, North Carolina is third with \$66,552,000, and Illinois is fourth with \$60,000,000.

On a per capita basis the total debt of all the States amounts to about \$5.50.

Evidence that these debts for the construction of good roads tend to increase the States' prosperity is seen by the fact that three of the first four states are among the five having more than one million cars in operation, according to the July 1st census made by AUTOMOTIVE INDUSTRIES. Citizens of these States may have relatively high tax rates for highway construction, but their ability to purchase automobiles is another indication of the truth of the belief held since the days of Imperial Rome by most thinking men—that good roads

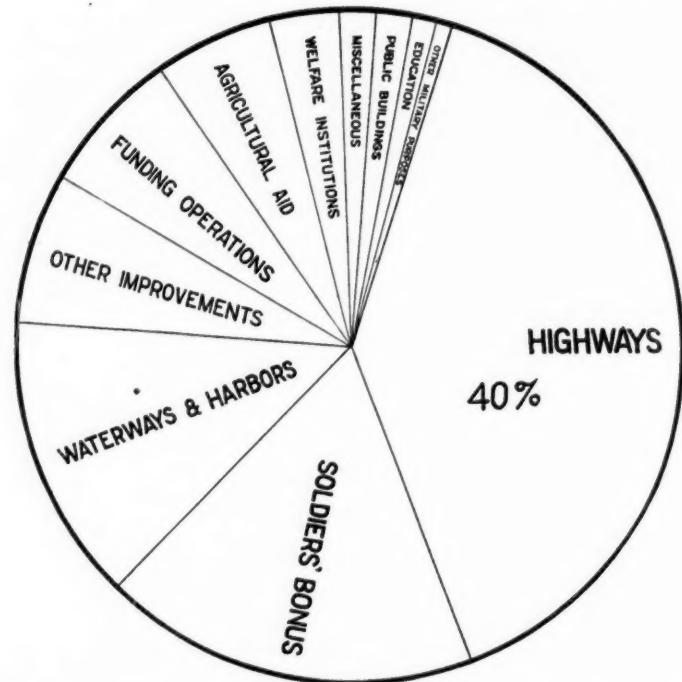


Chart recently prepared by the Bank of America, New York City, to show the purposes of State indebtedness, considering the nation as a whole. Based on 1925 figures

bring progress and prosperity to the surrounding country.

It is interesting to see what proportion of the cost of improving roads was paid for by direct assessment on motor vehicles. In 1923, 24.2 per cent of the total highway expenditures minus interest and principle payments, was received through license fees and gasoline taxes. For 1922 the percentage was 17.2 and for 1921 13.4.

During 1924 approximately \$209,000,000 was spent for highway maintenance and during the same period total motor vehicle revenues, including registration fees, Federal excise taxes and gasoline taxes were about \$444,000,000.

Thus, through direct taxation, automobile owners paid all maintenance charges on the nation's highways and contributed about \$235,000,000, or 30 per cent, of the \$782,000,000 spent for new construction in addition to their contributions as members of the community.

In 1923 there were five States—Massachusetts, Vermont, Connecticut, Maryland and Rhode Island—in which motor vehicle revenues were more than 50 per cent of the total highway expenditures. In 1922 Massachusetts was the only State receiving as high a ratio. In 1921 there were only five States in which motor vehicle revenues equalled or exceeded 25 per cent of highway expenditures. In 1923 there were 22 States in which revenues were greater than 25 per cent. The trend of the States to make motor vehicles pay an increasingly large share of highway costs is obvious.

At the end of 1923 there were only 13 States that did not have a gasoline tax. The average tax per vehicle from this source in 1923 was \$4.32, and the average total revenue for the States with gasoline taxes was \$16.87. The average total revenue for all States was \$14.96. During the first six months of 1924, the average gasoline consumption per car in the States having a gasoline tax was 211.5 gallons.

There are only 14 States in which all of the motor vehicle registration receipts are applicable to highway work, by or under the supervision of state highway commissions. On the average, for the whole country, 81 per cent of total receipts may be used for this purpose.

Purpose of Debt	Amount Outstanding		Per Cent	
	1922	1925	1922	1925
Highways	\$367,687,100.00	\$626,852,350.00	34.3	40.2
Waterways and Harbors	213,891,400.00	220,141,800.00	20.0	14.1
Soldiers' Bonus	130,022,000.00	287,097,600.00	12.1	18.4
Funding Operations	118,557,513.42	106,735,471.27	11.0	6.8
Other Improvements	101,550,561.00	108,130,912.00	9.5	6.9
Agricultural Aid	45,156,139.39	74,822,839.39	4.2	4.8
Public Buildings	20,254,523.28	27,599,523.26	1.9	1.8
Welfare Institutions	19,710,750.00	49,002,250.00	1.9	3.2
Miscellaneous	19,331,406.68	27,960,909.55	1.8	1.8
Other Military Purposes	18,440,810.07	13,395,787.54	1.7	.9
Education	16,904,282.44	17,002,990.67	1.6	1.1
Total	\$1,071,506,981.28	\$1,558,742,433.68	100.0	100.0

How the bonded debt of the 48 States is divided in actual figures and percentages. Table by Bank of America, New York

Of the 35 States that have gasoline taxes only 13 of them permit the full use of the tax receipts for highway work, the averages for the country being 58 per cent.

The relation of highway expenditures to income offer assistance in the determination of how much the people of a state or a community can afford to spend for highway construction. In the report of the Highway Research Board such a study was made for the year 1921, during which a complete survey of highway expenditures was made by the Bureau of Public Roads and

for which the latest estimates of per capita income for the United States were available. During this year highway expenditures were \$9.00 per capita, which represented a ratio of 1.13 per cent to the per capita income of the country. In 13 States per capita highway expenditures amounted to less than one per cent of each person's income. In 17 States highway expenditures were between one and two per cent of income. In 11 States they were between 2 and 3 per cent and in seven States they were over 3 per cent.

New Bentley Has 397 Cu. In. Motor, 144 In. Wheelbase

A NEW high powered, high grade car has been put out by Bentley Motors, Ltd., of London, and the following particulars concerning it are taken from a description which appeared in *The Autocar*.

The engine is a six-cylinder vertical type with overhead camshaft. It has a displacement of 6½ liters or roughly 397 cu. in., hence it is a decidedly powerful machine. Contrary to the usual practice, the cylinder heads are cast integral with the cylinder block, but the water jacket is cast with large openings at the sides and ends which are covered by aluminum plates held in place by screws with countersunk heads.

One of the most interesting features is the method of driving the overhead camshaft. It is well known that designing a silent drive for an overhead camshaft is a difficult task, and the departure from conventional practice made in the Bentley evidently had for its object to secure silent operation. The drive is at the rear end of the engine. There is first a two to one reduction by means of a pair of helical spur gears, of which one is of the fabric type, to a three-throw crankshaft. From the latter three connecting rods extend to a similar three-throw crankshaft in line with and coupled to the camshaft.

In order to provide for the difference in heat expansion of the cylinder block and the connecting rods of the timing gear, the latter are provided with stiff coiled springs under their cap nuts, which allow for a slight variation in the center distance between the upper and lower cranks. The bearings at both ends of the connecting rods consist of duralumin blocks and the crank pins on which they are mounted are hardened.

There are four valves per cylinder and these valves have two springs each. The two magnetos project outward from each side of the camshaft housing, being driven from the camshaft by means of helical gears. They have a flange and pilot mounting, and the holes for the holding bolts are made oblong, so as to permit of changing the timing. There is also a vernier timing arrangement on the magneto driving gear. By driving the magnetos in this way and coupling the generator to the rear end of the camshaft the torque load on the latter is non-reversible, which assures smooth operation. The water pump is connected to the forward end of the camshaft. To insure proper distribution of the water there is provided a tube running the length of the jacket on the inside, with graduated openings which discharge into the spaces around the exhaust valves and ports.

The crankshaft has eight bearings (the extra bearing being located between the camshaft drive gear and the flywheel mounting), and it is machined all over, the crank arms being of elliptical shape. In order to make it possible to use comparatively long crankpin bearings,

the crank arms on both sides of the pins are undercut a slight distance. A vibration damper is fitted to the forward end.

The inlet manifold is of rather unusual design. Immediately above the carburetor flange there is a horizontal header which is flange-bolted to two other, unsymmetrical headers which are bolted against the inlet ports of the engine. These latter two headers are connected together by a balancing pipe.

Aluminum pistons of the split skirt type are used. The only connection between the head of the piston and the skirts is the two inclined webs, and the effect of the pressure on the piston head is said to be to spread the pistons and apply their sides more firmly against the cylinder wall, thus preventing slap.

In addition to the four wheel brakes operated by pedal, there is a pair of extra brakes on the rear wheels, which are applied by hand lever. The clutch is of the single plate type, the driven plate being of duralumin and faced with asbestos fabric. The four-speed gearbox is separately mounted.

The engine has a bore of 3.94 and a stroke of 5.52 in. The wheelbase of the car is 144 in. and the track the standard 56½ in. The price for the chassis is £1,450, or about \$7,000.

System Reduces Motor Accidents

THERE are seventy cities of 100,000 or more population in the United States. Of the seventy just one so handled its street traffic problem that during the first five months of 1925 it did not have one single fatality. That is why the methods of New Bedford, Mass., are interesting.

The policy in the Massachusetts city is based on two salient ideas. One is the education of the people, especially of the children. The other is suspension of driving licenses as a preliminary protest to the reckless driver, and stern justice for him if he persists in his recklessness.

A special police campaign of education, with posters, charts and short talks, reached every boy and girl in public and parochial schools. Every reckless driver was quietly reported to the State Registrar of automobiles and received a stiff warning. This, and the thirty-day suspension of driving license, has reduced the number of court cases to a minimum.

Chief Doherty further lays stress on the idea that his orders to his traffic squad are that their business is that of train despatching, and not to stop cars unless absolutely necessary. They are not to back drivers up and make them go through maneuvers, while holding up traffic. And the argument with the motorist is unknown in Massachusetts.—*Philadelphia Evening Bulletin*.

Cadillac Entirely Redesigned; Chassis 250 lb. Lighter; Prices Lowered

Striking changes made in engine, reducing weight of this unit alone

130 lb. Increased power and flexibility result. Radiator shutters controlled by thermostat. 12 body styles.

By W. L. Carver

WITH the compensated crankshaft which has featured models of the last two years and the bore and stroke dimensions which have been characteristic since the original announcement of the eight-cylinder Vee-type engine retained as a foundation, the Cadillac Motor Car Co. now is producing an entirely new car.

While the new product bears the earmarks of Cadillac construction, many new features have been incorporated as the result of a program of simplification and the utilization of recent engineering developments.

The complete chassis weighs 250 lb. less than its predecessor, and of this amount 130 lb. has been removed from the engine.

Semi-elliptic rear springs with ball-jointed rear shackles have replaced the former platform type.

Two unit electrical equipment has supplanted the single unit generator and starter which have been used for more than ten years.

One timing chain is used instead of two and the generator and fan are belt driven. As the result of this arrangement, the valve actuating mechanism has been simplified and the intake manifold system has been improved materially.

The starting motor is placed vertically near the back of the crankcase and drives the flywheel through a system of crown gearing.

Along with this program of mechanical revision, which has resulted in a lighter car of more power and greater flexibility of performance, bodies have been improved by cooper-

ation between the Cadillac engineers and the Fisher Body organization. Previous body lines have been followed, but detailed refinements have resulted in a slight reduction in weight. In some instances doors have been made wider. The instrument board has been rearranged and its appearance enhanced by walnut panels.

The new models have been priced substantially lower than the old ones, the reductions in several cases being around \$500.

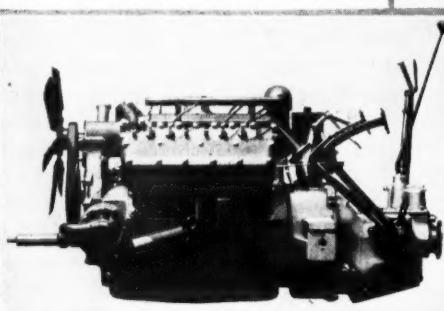
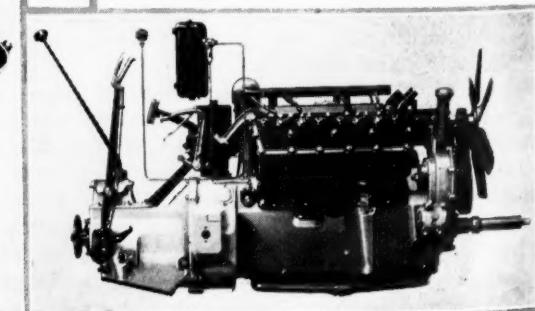
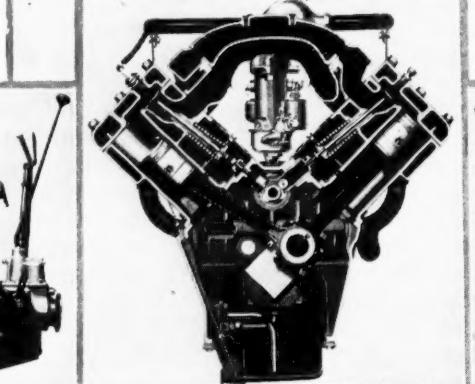
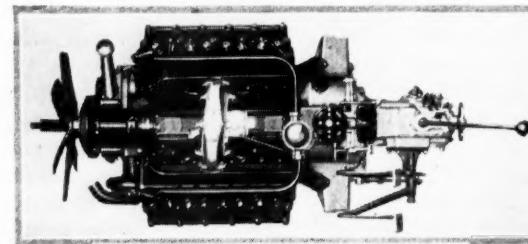
Bodies are divided into two classes which correspond to the two wheelbases in which the line is built. The Standard line, built on chassis of 132 in. wheelbase, embraces the following body types with prices as indicated:

Five passenger brougham.....	\$2,995
Two passenger coupe.....	3,045
Four passenger victoria.....	3,095
Five passenger sedan.....	3,195
Seven passenger sedan.....	3,295
Seven passenger imperial.....	3,435

Supplementing this Standard line is the Custom line, which is built on chassis of 138 in. wheelbase, with the exception of the roadster priced at \$3,250, which is on the 132 in. chassis. The balance of the Custom line, with prices, is made up as follows:

Touring car	\$3,250
Phaeton	3,250
Five passenger coupe	4,000
Five passenger sedan.....	4,150
Seven passenger suburban..	4,285
Seven passenger imperial...	4,485

Duco finish in three color schemes, blue, Waverly gray and

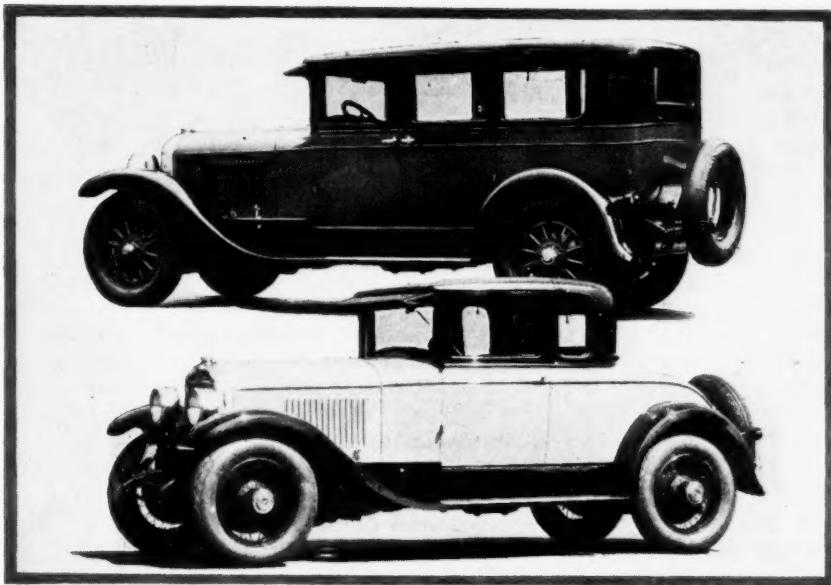


Left side of engine showing single water pump and hose connection

Top—View of powerplant, showing clean trough between blocks and arrangement of auxiliary units

Cross section of new Cadillac engine showing tappet arrangement, combustion space, new intake manifold and trunnions for main bearing studs

Right side of engine, indicating arrangement of generator, starting motor and ignition head. Oil pump, bayonet gage and breather opening are in foreground



At left—Front view of new Cadillac, showing the radiator design and the vertical shutters which are thermostatically operated. Above, at right, is shown the Standard two-passenger coupe, and below the Standard seven-passenger sedan. The custom models follow the same lines, but on a 138-in. wheelbase

Arizona gray, is applied to the Standard line. In the Custom line, any color scheme is available upon 60 days' notice, although these bodies are produced regularly with Duco finish in six color schemes, all of which are in regular production.

In addition to this range of finishes, the appearance of the entire line has been modified by new lines at the hood and radiator. While the curve over the top has been retained, the radii between this surface and the sides have been shortened and the latter slope outward toward the bottom. The new combination blends with present day body lines to better advantage and the appearance is further modified by the addition of vertical shutters in the nickel radiator shell. Drum type nickel head lamps and elliptical crowned fenders round out the distinctive appearance.

Wood wheels with heavy spokes and low pressure tires of 33 x 6.75 dimensions are standard equipment, although wire wheels are optional at additional cost.

Closed bodies are equipped uniformly with the Fisher one-piece ventilating windshield, an adjustable rear view mirror and an automatic windshield cleaner. The Custom line is fitted with bumpers at the front and bumperettes at the rear in addition to a motometer and spring covers. To prevent drumming, the tops of all closed cars are constructed of 2 in. wide wood slats covered with padding and leather fabric.

Complete Accessory Equipment

A variety of accessory equipment, including such items as robe rails, smoking and vanity sets, is offered in the closed models. Windows in the Standard line are operated by segment and pinion type mechanism while those in the Custom line are operated by cable lifts. In the Standard cars the upholstery is mohair velvet, while Custom cars are trimmed to the buyer's specifications. The brougham, being a two door job, has a door opening of 37 in.

While the new engine has a typical Cadillac appearance, closer inspection reveals a number of striking departures from previous practice. The crankshaft is substantially the same as that used for the past two years, although a trifle shorter than previously, the decrease having been made at the outer ends as the result of better under-

standing of the benefits of the compensating counterweights, which remove unbalanced loads from the bearings. For the same reason, connecting rod length has been reduced from 12½ in. to 11 in. between centers. In view of the stroke of 5⅛ in., it will be seen that the new length is still more than twice that of the stroke. The shorter rod brings about a substantial reduction in overall width of the engine and a material reduction in weight and has no effect on the smoothness and flexibility of operation, as all inertia forces are opposed and then balanced out by the compensating weights on the crankshaft. In order to improve bearing conditions at the piston, the pins have been placed 9/16 in. further down from the top, creating somewhat of a cross head effect with equal bearing value above and below the pin.

With the substitution of a two unit electrical system for the former combined starter-generator unit, a great number of changes making for greater simplicity and accessibility and better operation followed. The new generator is flange mounted at the top of the timing case and driven at about twice crankshaft speed by a heavy rubber Vee belt from a pulley mounted on the front end of the camshaft. The fan is mounted on the forward end of the generator shaft and has six blades with a diameter of 21 in. The first result of this change is the elimination of the friction clutch at the fan and, of greater importance, the elimination of one chain from the timing train. Along with this, the complicated chain adjusting assembly at the front end of the camshaft has been dropped.

In the new layout a single Morse chain is used to drive the camshaft and its tension is regulated by a spring actuated idler which is located in the right half of the timing case. Chain of the plain pin type is used instead of the former split pin type, but the quietness has been improved by using a chain of finer pitch. Another product of this revision is the substitution of a simple pressed steel timing gear cover of 3/16 in. thickness for the complicated aluminum casting assembly. With the elimination of the universal shaft, which extended the full length of the trough between the cylinder blocks to drive the generator, it has been possible to clean up this portion of the engine. The carburetor has been lowered to eliminate tortuous bends in the intake passage and improve the heating conditions in the incoming gas stream.

This change, in conjunction with the adoption of dome type combustion chambers which induce turbulence, has increased power output and improved the flexibility of performance. The overflow passage for the carburetor now passes down through the crankcase instead of being piped around the end of the block.

In conjunction with the change of carburetor location, the branch intake manifolds for each of the cylinder blocks have been removed from the cylinder blocks and now are cast separately and enameled on both inner and outer surfaces. Because of the additional room in the trough, roller tappets operating directly on the cams have replaced the former tappet levers. These tappets are drilled and subsequently hot-formed so that they are not only extremely light but have substantial sections and great strength at points of high stress. The tappet is restrained from rotation, which would throw the roll out of line, by a lateral plug which moves in a broached slot. This feature is utilized to simplify tappet adjustment. The adjusting screw is threaded into the top end of the tappet, which is split and equipped with a lateral clamping screw. Therefore, during tappet adjustment it is not necessary to restrain any part or manipulate a lock nut. The adjusting screw is set to the proper clearance and then is in no way affected by the locking action.

Front End Changes

The space between the blocks is remarkably clean. The carburetor is in the plane of the center crankshaft bearing, while the generator is clear of the front valve housing covers. The distributor head, which is Delco, as are the generator and starting motor, is driven by helical gears from the rear end of the camshaft and therefore is outside of the trough. Consequently nothing interferes with valve adjustment or access to the various parts of the carburetor. The ignition head is fitted with two four-lobed cams and two breaker arms which permit correct operation at higher speeds.

At the front end another set of striking changes is



Typical compartment of closed car, with Fisher ventilating windshield and walnut panels

visible. Where the cross shaft formerly drove two water pumps, one at each side of the block, one of these, that at the right side, has been eliminated and has been replaced by the oil pump, which is transferred from the front end of the crankshaft. The water pump on the left side has been made much larger and has a capacity greater than both of the previous pumps combined. A single connection connects the pump with the lower tank of the radiator. The outlet connection, which is rubber hose, extends back along the left side and the stream is divided so that half goes up through the left block and the other half is led through the crankcase by means of a cast-in copper pipe to an elbow which connects with the lower portion of the right cylinder block. Each block is connected to the top tank of the radiator by a rubber hose, although it is not necessary to break the hose connections in service work, as flanged elbows equipped with gaskets are bolted to the top of each cylinder head.

Thermostat Controlled Radiator Shutters

Vertical shutters which are thermostatically operated have been installed in front of the radiator core, which is cellular in place of the former fin and tube construction. These shutters, with their thermostatic control, replace the former rather complicated heat control system which was installed in the water lines. The radiator shell is stamped from nickel instead of being plated brass or steel. The carrier bars for the shutters and the bearing pins at the ends of these parts have been given a rustproof treatment. The radiator assembly now is secured to the front cross channel by two bolts and at the top is braced by two diagonal tubes which extend back to the dash.

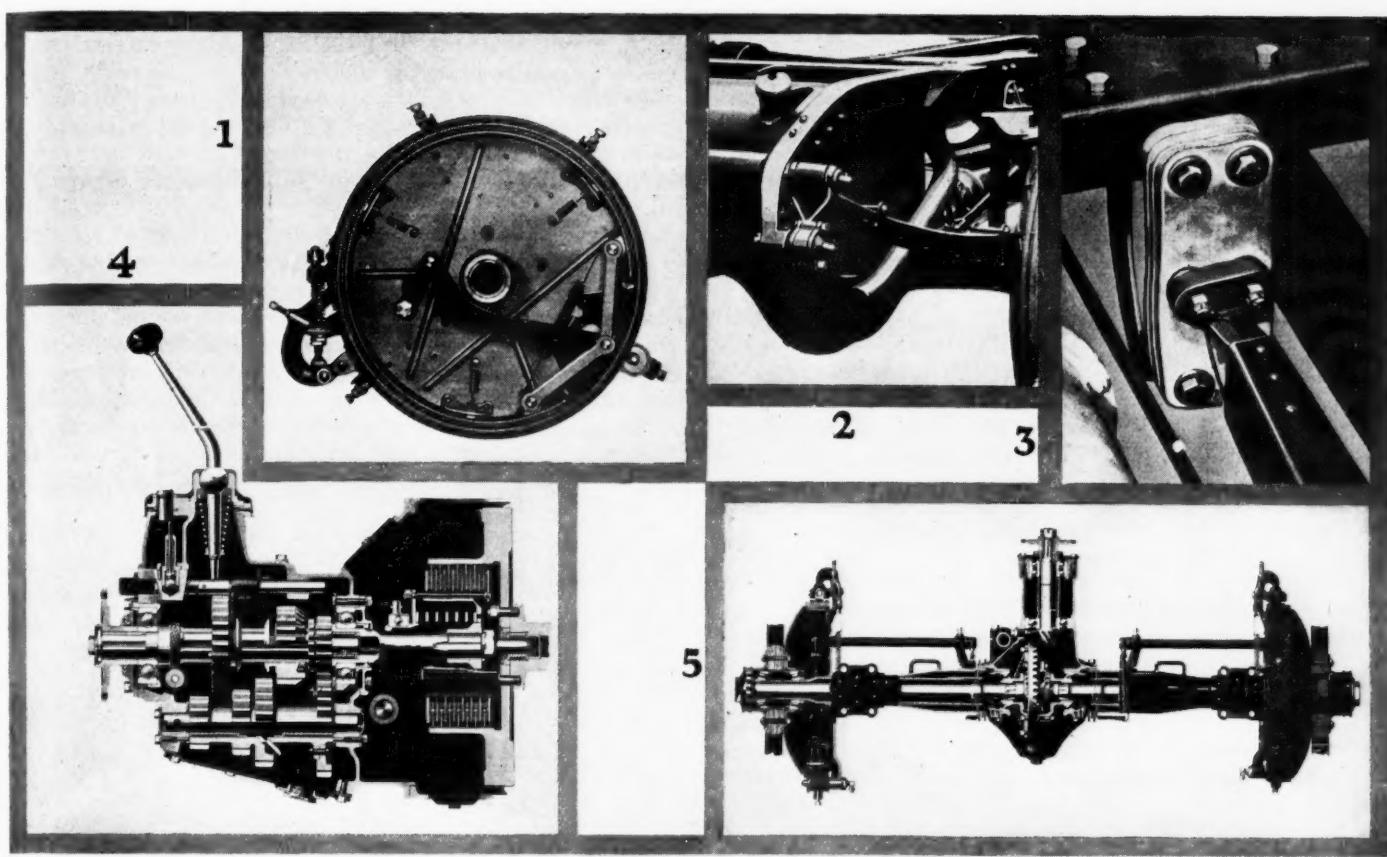
As shown in the illustration of the cylinder block, the starting motor is mounted vertically on the flywheel housing. A spur pinion at the lower end of the starter shaft is engaged with crown gear teeth cut on the back of the steel flywheel ring by the usual foot pedal on the toe boards. The first portion of the pedal travel advances the pinion into mesh with the flywheel gear while the last portion depresses the ignition switch. An over-running clutch interposed between the pinion and the starter shaft allows the pinion to overrun as the engine starts and complete disengagement occurs when the starter pedal is released. The starter motor, like all of the other accessory units on the engine, can be removed individually. In fact, the entire assembly gives an impression of the utmost accessibility. Each unit stands out by itself and can be removed readily by taking out two or three bolts or nuts.

The former pressure pump for the fuel line, which was operated at the front end of the camshaft by an eccentric and strap, has been placed just ahead of the left cylinder block, and its plunger is operated directly by an additional cam which is located ahead of those for No. 1 cylinder. The oil pressure regulator, which will be discussed in conjunction with the oiling and crankcase ventilating systems, is located just to the rear of the right cylinder block. Both of these are placed on the cylinder mounting surfaces.

Six Bearing Camshaft

The oil level gage has been placed on the right side of the crankcase instead of in the trough between the cylinders, and the screw type filler cap, which closes tightly, extends diagonally from the right side of the timing gear case.

Within the crankcase six bearings support the camshaft instead of the former five, and all of these are pressure lubricated. Incidentally, the tappets are fitted with lateral holes into which pins may be inserted so that these parts may be held up out of the way to allow the withdrawal of



1—Left rear wheel off, showing toggle arrangement for emergency brake. 2—Rear end of frame, showing shackle with ball mounting at lower end. 3—Fabric connection at front end of torque arm. 4—Cross section of clutch and transmission with crown gear on flywheel and Hyatt bearing in rear end of crank-shaft. 5—Cross section of rear axle. Note new bearing arrangement and concave brake drums which clear low pressure tires

the camshaft while the engine is in place in the chassis. The rear crankshaft bearing has been shortened while the front has been lengthened, although the center bearing remains unchanged. The diameter of all three continues at $2\frac{1}{8}$ in. Main bearing caps are of deep section aluminum alloy, eliminating the former auxiliary steel plates. Instead of through bolts, studs are used to secure the main bearing caps. These are not threaded into the aluminum of the crankcase but into steel trunnions which are inserted into longitudinally drilled holes, thus obtaining a very liberal bearing area on the more plastic aluminum.

Crankcase Has Ventilating Filter

One of the outstanding features of the new engine design is the crankcase ventilating system, which prevents the water and sulphur products of combustion from descending into the oil reservoir. This feature is based on the fact that the two plane compensated crankshaft acts as the impeller of a centrifugal pump and, given the correct conditions of air circulation, will build up a pressure greater than atmospheric in adjacent air spaces. Therefore, the design is arranged so that the breather just back of the water line elbow on the left side of the engine serves as an air intake. The breather opening on the right side has been closed and the oil filler is closed by a screw cap. Following these, holes have been drilled in the skirts of the pistons, and these engage with holes drilled in the inner sides of the cylinder walls at the bottom of the stroke. The holes in the cylinder walls are the outlets of the air pump system which has been postulated above.

Then, as the pistons are fitted with relief holes at the lower ring grooves, the products of combustion will seep

through at this point. They are forced down by the pressure of combustion above and opposed by the pressure greater than atmospheric which is produced by the crankshaft's rotation. At this stage it must be remembered that these products are vapors rather than liquids. Due to the pressure below, the only path for these vapors is out through the vent holes in the cylinder walls. These holes communicate with the valve housings which are closed by plates. The final outlet from each side is at a hole drilled well up in the rear wall of the valve housing enclosure. From this point elbows and lengths of metallic hose conduct the vapors down below the body of the car.

With this system the valve gear housings are not vented with the crankcase as is usual, but have only small drilled drain holes which allow any surplus accumulation of oil to drain back into the crankcase proper. Due to this arrangement, special provisions are made for the lubrication of the valve stems. Small semicircular grooves are cut in the piston lands between the second and third ring grooves from the top. Naturally, oil collects in these grooves, and as they pass small holes which are drilled in the cylinder walls to communicate with the valve gear chambers is blown through in a spray. While this system is installed as a whole in the new models, its fundamentals have been used for some time in Cadillac cars which have been delivered to parts of the country in which oil contamination was a severe problem. The results obtained are responsible for the adoption of this arrangement.

As mentioned previously, the oil pump is located at the right end of the cross shaft at the front and the oil pressure regulator is placed back of the right cylinder

block. The capacity of the pump has been enlarged materially so that the overflow at low engine speeds is great. Oil is delivered under the desired pressure to all of the cam and crankshaft bearings by the conventional expedients of copper tube manifolds, drilled holes in the crankcase and the crankshaft. The overflow which leaves the oil regulator is passed through a Purolator oil filter which is located on the front of the dash. Due to the large capacity of the pump, with consequent liberal rate of flow through the bypass at the pressure regulator, the rate of filtering of the entire oil supply is very high.

These provisions have resulted in an engine which has increased power and flexibility with longer life and at the same time more simple and accessible. In rounding the program based on this ideal, the diameter of the exhaust valves has been reduced $\frac{1}{8}$ in. to 1 $\frac{9}{16}$ in., while the cone type valve springs are made somewhat lighter and are reversed. The length of valve stem guides has been reduced and these no longer project into the ports. Both inlet and exhaust valves are made of silico-chrome steel in place of the former tungsten.

New Flywheel Arrangement

With the new arrangement of the flywheel, a steel band in which the crown gear teeth are cut is pressed over a cast iron center member and held in place by dowel screws. The center flywheel member and the outside ring of the multiple disk clutch are integral. Where the former construction involved six inserted keys for driving the clutch disk, 45 gear teeth are cut into the new integral member and the periphery of the clutch disks has been modified accordingly. Both the clutch and brake pedals are mounted on a common shaft which is fixed in a bracket that is bolted to the side of the gear case.

Within the gear box but few changes have been made, the chief of which is the simplification of the interlocking system by substituting one spring loaded ball for two plungers and a ball. The pilot bearing at the front end of the clutch shaft is a Hyatt roller running direct in the rear end of the crankshaft. An aluminum cover which forms part of the floor board trim has been added to the gear box cover. No change is made in universal joints, although the lubrication method has been modified for greater accessibility. Instead of the customary tapered screw plugs which are threaded into the steel protecting shell of the joints, Alemite fittings are located on the end of the propeller shaft adjacent to the joints and drilled leads conduct the lubricant to the working surfaces.

The torque arm has been shifted from the right to the left side of the propeller shaft and the ball and spring assembly at the front has been replaced by a rubberized fabric member consisting of three strips which are bolted to the cross member at the top and to a pressed steel bracket at the bottom. Two anchor bolts in the front end of the torque arm pass through all three strips of fabric. Need for lubrication is eliminated and the noise which developed periodically at this point is obviated.

Rear Axle Changes

Gears in the rear axle continue as formerly and, while the bearing layout on the pinion shaft is identical, two radex bearings have been substituted at the differential mounting for the previous single row and two row annular combination. At the outer ends of the live axles comprising the full floating construction, fourteen generated teeth have supplanted the former lug and slot arrangement. With the change to semi-elliptic springs at the rear end, the spring pads are now riveted to the axle housing instead of being swiveled. Here again the possibility of noise is eliminated and the new construction decreases the stress on the torque arm by imparting some

of the driving reaction to the springs. In addition to these, riding comfort has been enhanced, as the new rear end is not as lively as the old.

Although the spring suspension is changed, frames, with the exception of a decrease of $\frac{1}{32}$ in. in thickness, making this figure $\frac{5}{32}$ in., are identical with the frames of the last series. More than 30 lb. were cut off by this change.

As illustrated, the additional drop required for the elliptic springs was obtained in the forged spring horn. While the front of the rear springs, which are 60 in. long, is attached at the conventional pin and bushing, the rear end is shackled with pins above and a ball joint below at the spring horn. It is stated that this ball joint construction allows the same riding comfort as the older platform spring arrangement and makes for longer life of spring bushings. While the rear springs are $2\frac{1}{4}$ in. wide, the front springs have a width of 2 in. and a length of approximately 42 in.

Mufflers and exhaust pipes are substantially like their immediate predecessors. While the tire carrier continues at the back, the lamp combination has been moved to the left rear fender. Both the battery and tool box have been removed from inside of the frame and now are located in metallic boxes which are set in the rear ends of the front fenders and inclosed by locked lids. This arrangement makes both of these readily accessible with no disturbance of the car's occupants. The battery, which has a capacity of 130 amp.-hr., is inclosed in a composition rather than the usual wood case.

Brakes have been subject to little or no change. The ratio of braking effort has been modified to exert slightly greater pressure in front, and with this change the rear service brake bands have been made of hard brass so that the feature of thermal equalization will be maintained for longer periods under the conditions of greater load at the front end.

Electrical Equipment

All electrical wiring on the entire chassis is inclosed in armored conduit and all of the connections between the chassis and body are made at a junction box located on the front of the dash. The automatic cut-out, which formerly was on the hidden side of the instrument board, also has been moved to the front of the dash. The horn has been removed from under the hood and now is located on the left headlamp bracket. Instead of the former tilting headlamp reflectors, two filament bulbs controlled from the dash switch are used now for dimming. Auxiliary lamps of 3 cp., also located in the drum headlamps, are used for parking. A cigar lighter on a 12 ft. cord is located on the instrument board and may be removed to allow connection with a trouble lamp which is located on the front of the dash.

An interesting feature is the electrically operated gasoline gage. Due to using the pressure feed system for supplying the carburetor, none of the remote type of gasoline gages can be used. In conjunction with the Nagel Electric Co., Cadillac engineers have developed an electrical gage of the potentiometer type. The actuating element is interconnected with a float in the gasoline tank and connected by a single line of wire to the gage on the instrument board. The current consumption is in milliamperes, so that drag on the battery is almost negligible.

While the stability and strength of no single detail have been decreased, the entire chassis weighs more than 250 lb. less than its predecessor. The appearance of length has been enhanced by the longer line between the radiator and the windshield. The change from 33 x 5 high pressure tires to 33 x 5.75 balloons has also contributed to the impression of greater length in proportion to height.

Standardized Registration Methods Needed to Give Best Results

Systems now employed vary widely in different States and accurate tabulation of cars in operation is difficult in some cases.

Survey shows weak points. Remedies suggested.

By K. W. Stillman

WERE there actually 17,548,377 cars in operation in the United States on July 1, 1925, as reported in the July 16 issue of *Automotive Industries*? Do the reports, which are issued by the several States from time to time concerning motor vehicle registrations give a true picture of the motor vehicle population? Can the registration figures of any one State be directly compared with those of other States?

Although the answers to these questions must be in the negative as concerns absolute accuracy, the figures are sufficiently close for most practical purposes. The registration data published by *Automotive Industries* probably are within 5 per cent of absolute accuracy. The unfortunate condition is that more nearly accurate figures are unobtainable under present methods.

During the years that *Automotive Industries* has published motor vehicle registration statistics a great deal of information has been gathered regarding the methods used by the several States. Just prior to the last mid-year tabulation a special survey was made to learn the latest practice in regard to both legislative and administrative methods.

Based upon this accumulated information, it is possible to analyze the various registration methods in use, evaluate their worth for producing accurate data, and offer suggestions for certain changes which might be made in some of the practices to afford more satisfactory results.

There are three principal sources of error in the present methods. These errors occur in the recording of license tags issued to replace tags lost, damaged or stolen; in the recording of transfers of ownership when a car is sold or traded in for a new one; and in the recording of non-resident car owners.

There are four methods in use among the States for handling the replacement of lost or damaged tags: (1) Plates with the same numbers are reissued; (2) Plates bearing new numbers are issued but these issues are

IN the July 9 issue of *Automotive Industries*, John W. Scoville gave a comparison of actual sales records of several automobile manufacturers with State motor vehicle registration figures to show that the latter figures do not give accurate pictures of the number of automobiles being operated in the various States.

In obtaining the July 1 and December 31 registration figures which have been published in *Automotive Industries*, for a number of years considerable information has been acquired concerning registration methods. Previous to the publication of the 1925 mid-year registrations, which appeared in the July 16 issue, a special survey was made to learn the latest practice in registering motor vehicles.

This article contains a summary of the several registration methods in use, an evaluation of their accuracy, and suggestions for standards of practice that might give better satisfaction than some of those now being used.

segregated and are not included as part of the State's total car registrations; (3) Plates bearing new numbers are issued, are segregated, but are included in the total registration figures; and (4) Plates bearing new numbers are issued, are not segregated, and are included in the total registration figures.

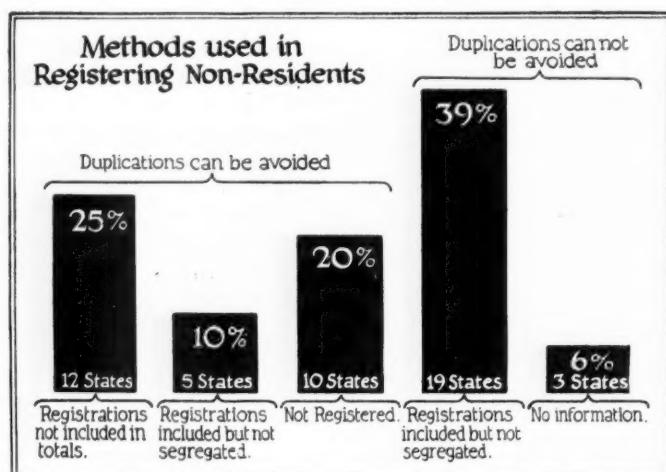
In the first two methods there is no duplication of registrations, since in one case a new license number is not issued and in the other duplicates are not included in the total registrations given out. Fortunately most of the States use one of these two methods. The third method gives a duplication of registrations which is entirely avoidable and should be considered when using figures from States employing

it. Two registrations are recorded for the same car. The District of Columbia, Georgia, Massachusetts, Pennsylvania, Utah, West Virginia, and Wyoming use this method of recording replacements, so to make their registration figures comparable with those of other States it is necessary to deduct from their total registration figures the number of replacement tags issued. The terms used by the several States to designate this transaction varies, "re-issues," "replacements" or "duplicates" being used interchangeably.

In States making use of the fourth method, in which replacement tags are included in the totals but not segregated, there occurs a duplication in total registration figures which is unavoidable. To be sure, the number of license tags replaced in any year will be but a very small percentage of the total number issued, so that this error will have no great influence on the value of the figures for most practical purposes. But we are here considering the possibility of obtaining exact registration figures, which, though quite impossible now, is surely a desirable goal for the future. Maine is the only State in which we are sure that this condition exists, but no doubt to be numbered in this class are a few of the States from which we have been unable to obtain information on this particular point.

The logical practice upon which all States might standardize seems to be either or both of the first two methods described. Each of these methods provides the owner with a new tag, furnishes the State with all necessary information, but does not affect the status of the registration figures published as a true criterion of the number of motor vehicles actually in operation in the State.

In recording transfers of ownership there are four methods in use as follows: (1) The license tags go with the transferred car, and the change of ownership, while usually recorded, is not included in registration totals; (2) The license tags remain with the original owner or registrant who may use them on another car in his possession, while the buyer of the car must take out a new registra-



Duplication of non-resident registrations can be avoided in 55 per cent of the States

tion which is added to the total registrations; (3) The same procedure is followed as in (2) except that if and when the original registrant transfers his tags to another car this transfer is counted as a new registration and included in the total figures published; and (4) Upon transfer the license tags are cancelled and new ones issued, which are counted as new registrations.

In each of these methods there is a possibility of duplication of figures. Some are small and of little importance and some influence the totals by as much as 10 per cent. Some duplications can be avoided by proper manipulation of figures furnished by the States, while others are entirely unavoidable under the present registration methods.

Use of the first method offers the chance of a small unavoidable error. As far as transfers are concerned, total registrations of States where this practice prevails show the actual number of motor vehicles in the State, but inasmuch as many cars are sold to dealers who may or may not resell them during the year, the total registrations may not give a true picture of the number of cars actually in operation. Nearly all cars are resold so that this factor is of minor importance—which is fortunate since there appears to be no easy way of eliminating it.

In the second method, immediately after the sale of a car there are two licenses issued against it—that which the original owner retains and that which the new owner must obtain before he can operate the car. This duplication is cancelled if and when the original owner procures another car upon which he places his original license tags. Since a large proportion of those who sell their cars do so with the idea of getting another, the amount of this duplication is small, but to the extent that original owners do not acquire other cars, registration figures for States where this method is used contain a small element of error.

The third method operates like the second except that if and when the seller of the original car acquires another and has his original license tags transferred to it, this transfer is treated as a new registration and included in the total figures published. Massachusetts is the only State using this method, but the number of transfers so included in their totals, and which should be deducted, are usually about 10 per cent of the total registrations.

Methods Differ

In the fourth method all tags are cancelled after a transfer and the buyer of the old car as well as the seller, if he gets another car, must take out new registrations. Rhode Island, District of Columbia, and Utah use this method. In Rhode Island, however, the new registrations arising from transfers are segregated and not included in their total figures. Figures issued by Utah and District of Columbia do contain these items and should be reduced by the number of transfers registered in order to obtain the actual number of cars in operation. The number of transfers in these States are given with other registration information.

As a practice upon which all States might standardize to good advantage the first method, in which the license tag follows the car but the transfer is not recorded as a new registration, seems to be the best now in use. In registration figures obtained by this method there is no error in the number of cars shown to be in the State and only a small chance for error in the number of cars being operated. From the viewpoint of the State this would mean that motor vehicle taxation rates would be based on the actual number of vehicles that were taxable instead of on an inflated quantity in which the same car might appear two or more times although subject to but one tax.

Adoption of this method would cause the least alteration in existing laws since a majority of the States now use it. With information from all States except North Carolina and West Virginia, 26 are known to handle car transfers according to this method. In 17 States the tag remains with the original owner, in three States it is cancelled, and in Virginia the tag follows the car or remains with the original owner at his option.

In registering non-resident car owners there are four methods in use: (1) Non-resident registrations are not included in total registrations; (2) Non-residents are included but are segregated from resident registrations so that they may be deducted; (3) Non-resident registrations are included in the totals and are not segregated from resident registrations; and (4) Non-residents are not registered.

Non-Resident Registrations

The first method, which is used by 12 States, provides no duplication of figures. Five States employ the second method and, obviously, there is duplication in their total figures unless the number of non-resident registrations is subtracted from them. In the total figures published by the 19 States in which the third method is used there is a duplication which is unavoidable under present conditions. The last method, used by 10 States, of course gives no duplication. In this census of methods information from three States was unobtainable.

Either the first or second method seems to be the most desirable one upon which to standardize. From the viewpoint of the States it would seem desirable to register non-residents since they use the roads of the State and add to the upkeep expense of the highways. It would also give an indication of the attraction of a State to alien car owners. Again, from the standpoint of the State as well as from that of the automotive industry, it is desirable to

separate non-residents from residents. Otherwise the number of cars owned and operated by citizens of the State cannot be known and the same car may be registered more than once during the same year, thus distorting the State's registration figures and those for the country as a whole. A total of 17 States now use one of these methods and 19 more States could adopt one of them, by simply providing for the segregation of non-resident registrations.

In addition to these variations in practice there is considerable confusion in the terminology used by the various States in tabulating motor vehicle registration data and in classifying the several types of motor vehicles. For example, 25 States either do not register tractors at all or, if they are registered, do not differentiate between them and trucks. Of those States that do register tractors, a number only register tractors not used for agricultural purposes. Twelve States follow the same practice in regard to trailers. Idaho follows the unique practice of including tractor registrations with passenger cars. Since each of these vehicles is a distinct type it appears to be desirable not only to register them but to segregate such registrations.

Segregated Bus Figures

Buses are becoming of increasing importance in the motor world. They serve a purpose quite distinct from that of passenger cars as ordinarily thought of, or of trucks, so that they might well be considered by the several States as a separate classification. Some States are now doing this, New Jersey and Pennsylvania being two that publish bus registrations as a separate item.

A few States such as Tennessee and West Virginia segregate taxicabs from other passenger cars, while New Mexico has a practice which, while approximating this method, results in much confusion in the interpretation of their registration figures. In this State passenger cars and trucks under 1½ ton capacity are listed together as "non-commercial cars." "Commercial cars" are all cars and trucks operated for hire and they are listed together. A separate division is made of non-commercial trucks of over 1½ ton capacity. Obviously, only an approximate segregation can be made of passenger cars or of trucks operated in New Mexico.

In California solid tired trucks are distinguished from those equipped with pneumatics. Maryland also segregates solid tired trucks. In New Hampshire separate figures for passenger cars and trucks are available only at the end of the year. North Dakota segregates passenger cars and trucks and then separates each division into Fords and non-Fords.

Uniformity Desirable

Although conditions vary in different States so that identical registration methods may not be possible in all, it is highly desirable not only as a State function but also from a national viewpoint that registration methods should be standardized as much as is practicable. We have already given our views on the most practicable methods of handling transfers, replacements, and non-residents. As minimum standards for classifications to be used in making registrations we suggest the following: Passenger cars, trucks, motorcycles, buses, trailers, and tractors. Figures also should be available and published with registration totals to show the number of replacement tags issued, the number of transfers recorded, and the number of non-residents registered, unless a method is used which eliminates these items from the total figures given out.

Adoption of these suggestions or of other methods to secure similar results would be very advantageous to the States. They would have more complete information con-

cerning motor vehicles operated within their boundaries for use in developing and administering methods of taxation; the apprehension of law breakers and the recovery of stolen cars would be facilitated and the States would have an accurate picture of its motor vehicle population for comparison with that of other States and with the country as a whole.

For the automotive industry, standardization of registration methods would provide reliable statistics upon which to base market studies involving territorial classifi-

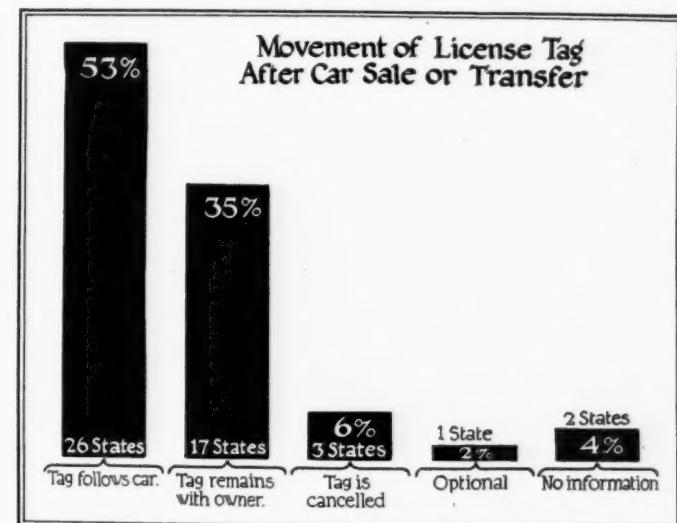


Chart showing State practices in handling car sales or transfers

cation, types of vehicles, or any other form of comparison which it might reasonably be expected to require.

In every way such a progressive step would be advantageous. The greatest barrier to its accomplishment probably will be the natural legislative and administrative inertia of the several States which, having registration laws and administrative methods that give reasonable satisfaction, will hesitate to make any changes. The automotive industry, which would receive great direct benefits from standardization, will find it worth while to enlist the services of distributors and dealers in each State to work for and to use their influence in putting across a revision of registration methods. It is an important problem and deserves the study and assistance of the industry.

AMERICA has little to learn from Great Britain in the matter of road construction, highway financing and other similar problems, according to A. B. Fletcher of the U. S. Bureau of Public Roads, who has recently returned from traveling over the rural roads of England, Scotland and Wales. He reports that on the whole the average rural English road is much better than our country roads, but the like of our best trunk roads is not to be found in that country.

"Our road problem is so much bigger than Great Britain's," says Mr. Fletcher, "that the reason for the better average improvement of the English road is apparent. In all England, Scotland and Wales there are but 177,000 miles of road, cities and boroughs included, as against our estimated mileage of 2,941,000 outside of the cities and towns."

"The revenue which the British Ministry of Transport has for road purposes, derived wholly from the registration fees paid on account of the motor vehicles, amounted in 1924 to about \$72,000,000. This is about the same sum Congress has been appropriating recently for our Federal Aid work."

Heat Treatment for Plain Carbon Tool Steel Is Standardized by A. S. S. T.

Recommended practice of September 1923, is revised. Steel normalized Before it is hardened. Operations described. Tempering heats are shown.

THE American Society for Steel Treating has revised its recommended practice for the heat treatment of plain carbon tool steel which was originally issued in September, 1923. Before the steel is hardened it is normalized, this involving a heating and a cooling operation, as follows:

Heating—Place steel in furnace so as to expose maximum surface area. Heat uniformly to a temperature above the upper critical point indicated in Table I, and hold at this temperature for sufficient time to obtain complete penetration of heat and for complete refinement of grain.

Cooling—Remove from furnace and cool freely in air.

Table I
Normalizing Temperature and Carbon Range

Carbon	Degrees Fahr.
0.65 to 0.80 per cent	1475 to 1525
0.80 to 0.95 per cent	1475 to 1500
0.95 to 1.10 per cent	1500 to 1575
1.10 to 1.25 per cent	1575 to 1650

Cross Sections, Weight and Time

Thickness of Largest Section of Unit	Weight of Unit in Pounds (Approximate)	Time of Heating In Hours (Approx.)	Time of Holding In Hours (Approx.)
Up to and including 1 inch	Up to 100	1/4	1/2
Over 1 inch and including 2 inches	Over 100 and including 300	1 1/4	1/2
Over 2 inches and including 3 inches	Over 300 and including 500	1 1/4	3/4
Over 3 inches and including 4 inches	Over 500 and including 1000	2 1/4	1
Over 4 inches and including 5 inches	Over 1000 and including 1500	2 1/4	1
Over 5 inches and including 8 inches	Over 1500 and including 2000	3 1/2	1 1/2

The heat treatment itself consists of three operations, namely, heating for quenching, quenching and tempering.

Heating—Heat the steel uniformly to the temperature indicated in Table II.

Quenching—Quench from this temperature in water but do not cool below temperature of boiling water (212 degrees Fahr.).

Table II
Heat Treating

Carbon Range, Per Cent	0.65-0.80	0.81-0.95	0.96-1.10	1.11-1.25
Hardening Temperature	1550-1450	1460-1410	1390-1430	1380-1420
Quenching Medium and its Temperature	Water at 70 Degrees F.			

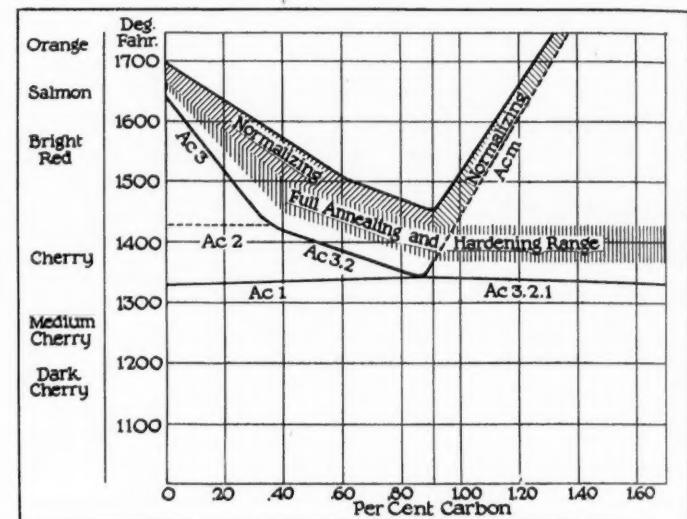
Tempering—Reheat immediately in oil, salt (NaNO_3) or furnace for the time and at the temperature specified in Table III and cool.

Table III
Tempering Tool Steel

Results Desired	Tempering Medium	Temperature
Relieving Strains	Oil	350 to 375 Degrees Fahr.
Relieving Strains and Reducing Brittleness	Oil	400 to 500 Degrees Fahr.
To Relieve Strains and to Toughen	Oil	500 to 600 Degrees Fahr.

Notes About the Process

General—The recommended practice for the heat treatment of tool steel applies to the highest quality performance of tools for general purposes only. For specific



Critical range diagram for iron-carbon alloys, showing normalizing, annealing and hardening ranges

applications where special structural requirements seem to be necessary, deviation from the recommended practice must be left to the judgment of the individual heat treater or metallurgist.

Normalizing—A normalizing treatment for all tool steels is recommended to obtain a uniform and refined grain structure, which enables the operator to predict the behavior and performance of the tool steel during heating and quenching for hardening.

The variation in temperature for the different carbon ranges becomes evident upon a careful examination of the critical range diagram. A temperature very much in excess of that required to produce solid solution (austenite) is conducive to austenitic grain growth and intergranular weakness.

A low normalizing temperature for high-carbon steels (1.25-1.50 per cent carbon) which fails to break up the massive cementite results in a brittle structure, since the rate of diffusion of the excess cementite depends upon the temperature. The solubility of carbide in iron being greater, or increasing as the temperature rises, the rate of this solubility is equivalent to the slope of the Ac_m line in the diagram.

The higher normalizing temperatures given in Table I apply to the lower carbon ranges and the lower temperatures to the higher carbon ranges for steel of the hypoeutectoid composition, or, in other words, "the normalizing temperature for hypoeutectoid steels varies indirectly as the carbon percentage rises or falls, and the normalizing temperature of hyper-eutectoid steels varies directly with the percentage of carbon."

Heating for Quenching—The wide range of temperature in the 0.65 to 0.80 per cent carbon steel is needed as a number of tools such as shear blades, arbors, mandrels, and others are all around the low point, and because

of mass and forms require somewhat higher temperatures for quenching.

The quenching temperatures given are at the lowest temperature range consistent with highest quality tools; deviations from it are not recommended, but may be practical for diverse reasons.

Quenching—Water is the universal quenching medium and by varying its temperature and manner of application for the abstraction of heat, almost any degree of variation of structural conditions of the tool steel can be obtained. There are, however, special cases where oil may be a more suitable quenching medium.

Steels Suitable for Various Uses

Carbon Content 0.65 to 0.85 Per Cent

Shear blades, boiler snips and cups, hammers, stamping and pressing dies, mining drills.

Carbon Content 0.81 to 0.95 Per Cent

Hot and cold sets, chisels, dies, shear blades, mining drills, smiths' tools, set hammers, swages, flatteners.

Carbon Content 0.96 to 1.10 Per Cent

Small cold chisels, hot sets, small shear blades, large pinchers, large taps, grinitre drills, trimming dies, turning tools, planer tools, drills, cutters, slotting and milling tools, mill picks, circular cutters, small shear blades, threading dies.

Carbon Content 1.11 to 1.25 Per Cent

Small cutters, small taps, drills, slotting and planing tools, wood cutting tools, turning tools, razors, etc.

Tempering Heats for Various Tools

Temperatures—350 to 390 Degrees Fahr.

Lathe tools for brass and copper alloys. Milling cutters for brass and copper alloys. Scraper and cutting tools for soft metals and micarta. Drawing mandrels, drawing dies, bone-cutting tools, hammer-faces, steel engraving tools, wood-carving tools, cutting tools for iron and steel, hand tools, threading dies for brass.

Temperature—400 to 500 Deg. Fahr.

Hand taps and dies, hand reamers, drills, bits, cutting dies, penknives, milling cutters, chasers, inserted saw-teeth, press dies for sheet steel, rock drills, taps and dies, wire-drawing dies, dental and surgical instruments, twist drills.

Temperature 500 to 600 Deg. Fahr.

Bending and forming dies, shear blades, chuck jaws, forging dies, drifts, gages, press-dies, flat drills, reamers, chisels and tools for woodcutting, hammers and drop dies, axes, lathe tools for copper augers, cold chisels, copper-smith tools, grinders, screw drivers, molding and planing tools, hacksaws, needles, butcher knives, saws.

Campbell Nibbling Machine

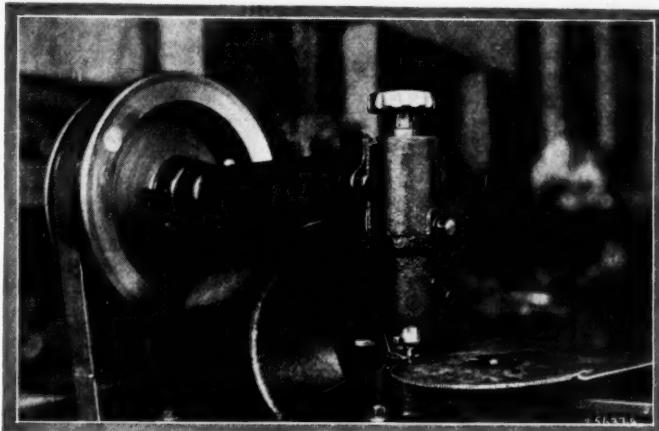
FAST cutting (20-30 in. per minute), no distortion of metal and long life of punches and dies, with low replacement costs, are advantages claimed for the Campbell nibbling machine, manufactured by Andrew C. Campbell, Inc., Bridgeport, Conn.

Although the nibbling process in working with sheet metal is comparatively new in America, machines of this type are coming into use chiefly because of the time saving they make possible. Using a nibbling machine, the toolmaker or sheet metal worker is enabled to cut internal or external designs with ease and rapidity, and the strain on the metal is said to be so slight that the process may

be used instead of drilling and sawing in cases where induced strains are a factor. The work is said to be so smooth that little grinding or filing is necessary to finish the job.

Designs may be cut either from a scribed outline or from a template. The tool set-up can be changed easily, an elevating spring in the ram carrying the punch facilitates removal of the work without altering the tool set-up, and the double ended punches may be inverted when one cutting edge becomes worn.

Use of the nibbling machine is recommended for cutting templates, stripper plates, cams, gages, gaskets,



Campbell nibbling machine

flanges, patterns and other experimental work where special equipment would otherwise be necessary.

The Campbell Nibbler No. 1 requires 1½ by 2 ft. floor space, is 4½ ft. high and weighs 470 lb. It is operated by a ½ hp. motor and the maximum cutting capacity is 3/16 in. in mild steel. The depth of the throat is 6 in. Type No. 1B is similar to Type No. 1 except that it requires slightly more floor space, has a throat depth of 24 in. and weighs 1000 lb.

Type No. 2 requires more floor space than No. 1, is 5 ft. high, requires 1 hp., and has a maximum cutting capacity of ¾ in. in mild steel.

THE Cleveland Worm and Gear Co., Cleveland, Ohio, is now marketing a series of stock worm gear reduction units for direct-connected loads, designated as Type AT. A square housing is used, which has large oil capacity and ample cooling surface. All ribs are cast on the inside of the cast iron housing, which gives a smooth exterior easy to keep clean. The driving shaft is mounted in ball bearings and the driven shaft in taper roller bearings.

The gearing used in these units is of the automotive type, which the Cleveland Co. has been manufacturing for 12 years, and for which it has developed special methods of manufacture. The worm is machined from a solid nickel steel forging. After the threads have been milled, the piece is carbonized and case-hardened, and the forging is then given a heat treatment to refine the core. Threads and bearing seats are then accurately ground and polished.

The gear consists of a chill-cast phosphor bronze rim, shrunk and keyed to the cast iron center. The teeth are hobbed in the solid bronze casting. Lubrication is by splash.

These reduction gears are made with ratios ranging from 4:1 to 100:1 and with capacities of from one-fourth to several hundred horsepower. In the design shown the worm is underslung. An overslung type of drive is also made, which is designated the RT type.



The FORUM

Balloon Tires and Road Cement Cause Comment

Editor, AUTOMOTIVE INDUSTRIES:

During the war I was "doing my bit" by inspecting airplane material for the Navy. Armistice day I was transferred to the Standard Aircraft Corporation at Elizabeth. There I found a solution to a problem that had been worrying me for a long time; and that was what to use in the way of tires for the Dey Electric. The 3 x 30 in. used on the Ford front wheels were ample in size for a car weighing from 1000 to 1200 pounds, such as I had in view; but I was impressed with the thought that they would look too skimpy. The larger tires were too heavy to suit my ideas for a light car. I wanted something that was light and efficient, and when I became acquainted with the 125 x 750 mm, which are slightly less than 5 x 30, which weighed 12½ pounds, including tube, I decided that my problem was solved. They were using these tires on the DeHaviland and 4's, which weighed about 3,000 pounds and naturally met some very severe shocks when landing on only two wheels. The only question that arose was whether they would stand the road wear, and I decided that if they gave satisfaction in other respects that an eighth of an inch rubber added to the tread would make them practically perfect. I interviewed a Goodyear service station expert, and he tried to discourage me, without effect.

On May 11th, 1920, the Goodyear company mailed me a sample section of these tires. Note that this is three months before the Putnam application was filed. I had sent for this and a sample section of the rim for reference in designing my wheels. I purchased a set of five shoes and seven tubes in 1922, disregarding the protests of their New York sales manager that they would be a flat failure. I used all the arguments from my theories that are now being put forth from experience by the various manufacturers. I have been using these tires on the streets since April, 1923, and thus far have had only two punctures; the extra shoe is still in its original paper wrapping.

These tires are four ply and apparently identical with the present balloon with the exception that the tread is smooth. In spite of their smoothness, I have never skidded. There would be no invention in adding a non-skid tread, for in the present state of the art it would be the obvious thing to do.

I never considered that I was entitled to a patent, for I was simply adopting a tire that was already on the market, and I cannot understand why any one should be allowed one. The tire was invented, or designed, by the same company probably some years before. In 1889 the Julian Storage Battery Company tried to obtain a patent giving them broadly the right to propel cars by means of storage batteries, claiming that they were the first to do so. The application was rejected and was vigorously fought for. The final authority decided that there was no invention involved in adopting a new article of manufacture to an old device, with the excuse that it had not

been done before. If that was permitted, every time a man invented a new motor, or other device, he would have to take out a separate patent for each and every purpose for which it could be used; and if he should overlook one, another party could step in and cover it for that purpose, thus preventing the inventor from using it for a purpose for which it was obviously practical.

In the early issues of *The Horseless Age*, in the latter part of 1895, will be found advertisements of the Kane-Pennington car, illustrated. It will be noted that the tires are exceptionally large, especially for the apparent weight of the car, which is of the cyclecar type. They appear to be fully as large as the balloon type, and I do not doubt they were of proportionately light construction. They may have been of the single tube type; I have no information as to that except they were popular in those days, but that would not affect the principle involved.

HARRY E. DEY.

Rapid Hardening Cement

Editor AUTOMOTIVE INDUSTRIES:

The rapid hardening English road cement mentioned in your July 9 issue doubtless belongs to the class of Super Portland cements which have been made and used in Europe for a number of years. These cements are merely Portland cements which harden more quickly than the conventional Portland cements by reason of extreme care in details of manufacture. Super Portland cements do give quick hardening concrete but as a rule do not withstand storage for more than a few weeks time without serious loss of activity.

Super Portland cements were developed in Europe to meet the competition of alumina cements which received immediate acceptance during the war on account of their quick hardening properties which permitted the use of alumina cement concrete, gun foundations, fortifications and the like on the day following their pouring. For several years past the Atlas Lumnite Cement Co., a subsidiary of the Atlas Portland Cement Co., has been manufacturing Lumnite cement an alumina cement based upon the invention of the writer's associate, Mr. Henry S. Spackman. Lumnite cement, while allowing the same length of time for placing as does Portland cement, gives concrete which in from twenty to twenty-four hours develops strength far exceeding the requirements at the age of 28 days for Portland cement concrete. Numerous concrete road slabs have been placed in service in twenty-four hours and have been traversed by heavy tractors, the cleated wheels of which failed to mark the concrete. In addition to the conventional uses for roads and buildings, Lumnite cement has found numerous special applications on account of its requiring but one day for curing before being placed in service.

Lumnite cement consists principally of lime and alumina with small percentages of silica and iron oxide. It is entirely different in chemical composition from Portland cement.

E. L. CONWELL.

Balloon Tires and Wheel Wobble

Editor, AUTOMOTIVE INDUSTRIES:

In the use of balloon tires I have never experienced any trouble from wobble or hard steering. I have what is practically center steering; the king pin being located only one half inch from the center line of the tire, the front wheel brake drums forming a recess to inclose them, the wire spokes attaching to the edge of the drum. These king pins are parallel with the vertical axis of the wheel, but are inclined forwardly from the top, $7\frac{1}{2}$ deg.

This is an exceptionally large angle, and probably would

not be practical if they were inclined sideways also. It provides an exceptionally safe steering design, because of the inclination to return to the straight ahead position, and the center steering causes bumps to be taken head on without the tendency to react through the steering wheel.

Because of these features and the lightness of the car I do not use any gearing in the steering post. The difference in length of the levers, one on the post and the other attached to the stub axle, provides a reduction of two to one; a Ford gear gives four to one; consequently I obtain a maximum turn of 45 deg. for the inner wheel with a quarter turn of the steering wheel. I keep the front tires pumped to 35 pounds, which allows them to turn with little effort when at rest. I do not consider it necessary to have the front tires soft, as there are no passengers over, or near, them.

HARRY E. DEY.

Drying-Time Meter for Varnishes

THE application of paint or varnish for decoration or protection is an important part of the manufacture of many articles. It generally comes near the end of the process where a disarrangement of the schedule would cause the most confusion. Hence the commercial value of a surface coating is often determined by the rate at which it dries. Ordinary drying tests made by different operators do not always agree nor are the various stages in the drying period exactly defined. In a paper read before the annual meeting of the American Society for Testing Materials, J. McE. Sanderson described an apparatus for measuring drying times, and a method for making measurements.

Several attempts, he said, have been made in the past to devise mechanical means for testing and recording drying times. The best of these is undoubtedly the one devised by H. A. Gardner. Preliminary investigation failed to disclose any method of application superior to that of Walker and Thompson whereby the material is spread by centrifugal force when poured on near the center of a rapidly rotating disk. This method is applicable to varnishes and oils and to most enamels and paints.

Starting with the coated disks, the next step was to devise a mechanical means of continuously touching the film as it dried. This was done by bringing it into contact with a powdered solid, such as sand, which was run through a funnel placed so that the tip was within about $1/16$ in. of the disk. In this position, the sand would run only as the disk moved under the tip of the funnel.

Special Testing Machine Built

A machine was built, in which was combined the coating and testing mechanisms. In this machine, the disks are revolved for coating by an electric motor (taken from a dictograph) which can be regulated very closely to any speed between 200 and 500 r.p.m. By a simple shifting of gears, the drive can be changed from the motor to clockwork which rotates the disks once in 12 hours, or once in 6 hours.

For the sake of getting a dependable uniform flow through a small orifice, it has been found desirable to use round-grained sand sifted through a 60-mesh and retained on an 80-mesh screen. To maintain a steady flow over a period of several days, it is necessary to have

both the sand and the funnels thoroughly clean and dry. The disks used for most of the tests have been either tin or double-strength window glass. Tests can also be run on fiber board, wood, or other materials on which the coating is to be applied in actual use. Disks of material which tends to warp must be kept flat by clamping to the rotating tables. It is possible to apply the test after two or more coats of finish have been applied. These features are important, as finishes sometimes dry differently on different surfaces and the second coat differently from the first.

Tests by the method outlined above seem to determine a fairly definite degree of drying which is called "dry free from tack." This point is indicated by the sand which adheres to the surface after the disk has been turned upside down and tapped sharply to remove the excess. The point which is called "dry to touch" is then determined by brushing the disks vigorously with a bristle paint brush which removes the sand particles that are not actually embedded in the varnish film.

Anti-Friction Bearings

IN our report of the American Gear Manufacturers' Convention the statement was made, in connection with the discussion of the report of the Spur Gear Committee, that when gears are worked under heavy load for a long time and the oil in the transmission case is raised to a high temperature in consequence, the first thing that gives trouble is the anti-friction bearings.

We are informed by Mr. Tenney, who made the tests on which the report was based, that the trouble referred to was not with the anti-friction bearings but principally with the pilot bearing on the main drive shaft and to a certain extent with the bearings of the countershaft, all of which were of the plain bronze-bushed type. Mr. Tenney writes:

The result of our test shows that in no instance have we had failure of the anti-friction bearings in any of our designs, or at any temperatures, within the working life of the gears. The anti-friction bearings have proved entirely immune from this trouble and will stand more than the gears. On the short duration run, as in light passenger car transmissions, where the temperature is not excessive, the bronze bearings show a very satisfactory life and, of course, much lower initial cost."

Just Among Ourselves

Experts in Everything: Insurance the Latest

THE qualities needed for success in the automobile business become more complex every year. Once upon a time the ability to make a car run was the chief requisite. Then it became necessary to understand and apply efficient production methods as well. Full understanding of sales and advertising became a necessity a bit later. Later still the heads of automobile companies found it necessary to become or to hire finance experts, both for proper handling of factory financing and for working out of plans for financing retail sales. And now it seems as though he would have to become an insurance expert! If he follows all the things that are being printed and spoken about automobile insurance just now he shouldn't have much trouble finding something with which to start his studies. The air is full of it. It will be some time before the smoke has cleared away sufficiently to permit accurate appraisal of the results of the strife.

Prices Down Again in 1925

1925 SEEMS destined to record another definite drop in the level of passenger car prices. A few advances have been made since the first of the year, but they have been far outweighed by the number and size of decreases. Nearly every new model that has been brought out recently carries lower prices than its predecessor, some of the cuts having been very large in proportion to the total price of the car. That the public will continue to get more for the dollars it spends in automobile than in buying any other product certainly will continue to be true for the next

twelve months, as it has been for several years past—even more so.

Automotive Writing, Walter Page and Thinking

THE written word has played a big part in automotive development. The motor vehicle, of course, was its own best salesman, but the men who conceived and expressed the broad function of the automobile and told about its possibilities in vivid, interesting fashion, both in advertising copy and in editorial articles, had a very real share in bringing the industry to its present stage. In the future, as in the past, freshness and sincerity of expression constitute the most potent qualities in writing of this kind. We've just got around to the reading of B. J. Hendrick's "Life and Letters of Walter Hines Page," and have been particularly impressed with the extent to which these vital qualities are embodied in the late Ambassador's writings. Freshness, vigor and sincerity characterize his thought and, combined with frankness, make his ideas on a variety of subjects most interesting reading. His writing has a natural, unforced, dynamic quality which gives it weight and punch and which resulted from a naturally active, truth-seeking mind. Reading of his letters gives us the idea that that automotive advertising and publicity writers may well be chosen for the qualities of their mental habits rather than for any veneer which may brighten their written expression. A definite thought simply and honestly expressed may carry round the world while a conventional bromide will die at birth however suave and polished its presentation. Page's biography is worth reading with automotive writing of different varieties in mind.

Car Carrying Capacity and Traffic

WITH that pointedness of phrase so characteristic of his always interesting writings, Charles E. Carpenter in *The Houghton Line* asks why, since there are now enough motor vehicles in operation to carry the entire population, is there any necessity for pedestrians and cumbersome traffic operations? Which brings to mind again the more serious thought that traffic congestion in many cities is caused partly, at least, by vehicles being operated with only a small part of their carrying capacity in use. Perhaps some of that difficulty will be eliminated in the distant future by a greatly increased use of smaller vehicles with more limited carrying capacity.

Chrysler Insurance Helps Market Studies

WHILE discussion of the Chrysler insurance plan continues, several secondary advantages which will accrue to the factory occur to us. Before the insurance can go into operation, as far as the buyer is concerned, the dealer must turn in to the factory the name and address of the man to whom the car is sold. He is certain to do this in practically every case, because the buyer will insist on it. That means that Chrysler probably will be able to have a more complete record of its owners' names and the exact date of sale of its cars than most other companies. Every factory, of course, provides forms on which dealers report sales, but every sales manager knows the difficulty of getting these reports. Chrysler also will have an excellent record of every Chrysler car which changes hands within one year. All of this should be very valuable information from the standpoint of market analysis. N. G. S.

Spindle Speeds of 2000 R. P. M. Possible on New Chucking Machine

Chucks opened automatically for most classes of work and operator is required only to close them by use of air control valve after insertion of the rough piece.

HIgh production rates are obtained with the new 12-A New Britain Automatic Chucking Machine by bringing up the speeds of the tool spindles to the limit of the cutter's ability to stand up, and by simplifying the process of loading the work chucks.

In view of the recent improvements in the metallurgy of brass and bronze and the application of this machine to work in these and other materials, tool spindle speeds can be set to run at rates in excess of 2000 r.p.m. The work chucks are opened and closed by air pressure and act almost instantaneously in either direction. For most classes of work chucks are opened automatically and the operator is required only to close the chuck after the insertion of the rough piece by throwing a small air control valve which is located on each of the four work spindles. Depending on the characteristics of the piece to be machined, production rates can be varied in 13 steps from 177 to 2370 pieces per hour.

In addition to the possibility of high tool speeds and minimum loading time requirements, the new machine is equipped with a master pressure feed lubrication system which controls the supply of oil to every bearing and requires filling at but one point. Although a countershaft

arrangement is obtainable, the machine is designed to be self-contained, with an electric motor installed in the base and a single belt driving the main shaft. Another nice feature is the arrangement of the bed and the base. The former overhangs the supporting member at the front so that an operator can sit at the machine comfortably. This feature is important, since all other factors are coordinated for maximum production. Therefore, the ability of the machine is determined by the ability of the operator to supply parts, and this can be done best when the operator can work without unnecessary fatigue. In one case where this machine has been in operation, the actual production rate has exceeded 90 per cent of the theoretical daily production figure.

Has Four Work Carrying Chucks

As illustrated by Fig. 1, the new automatic chucking machine consists of four work carrying chucks which are non-rotating and indexed in a fixed plane. Three revolving tool spindles are mounted in the head stock at the left, being arranged so that the front work chuck is left available for loading and unloading. Two or three jawed chucks are used as required and the maximum swing over the chuck jaws is $5\frac{1}{2}$ in. This machine is typical of a larger model, No. 23-A, which is just ready for production, although the second machine will swing 7 in. and has five chuck positions and four work spindles.

From the main shaft the three work spindles are driven by change gear trains at any speed from 366 to 2065 r.p.m., being set individually to suit the characteristics of the tooling at that station. The spindle at the top is equipped for tapping and threading operations and can be run at speeds of approximately half the rates of the other spindles. Also, this spindle is equipped with a reverse gear for backing off the tap or die. The travel or feed of each of the tool spindles, which is $2\frac{1}{2}$ in. maximum, is controlled by a drum cam which is located at the back of the bed, as shown in Fig. 2. All of the cams for controlling every feature of the machine's operation are located on this convenient shaft, which is driven by silent chain from the main shaft. Another shaft assembly, which is shown outside of the camshaft in Fig. 2, controls a speed-up mechanism which accelerates the work head during the indexing period. The camshaft extends through the bed and also operates

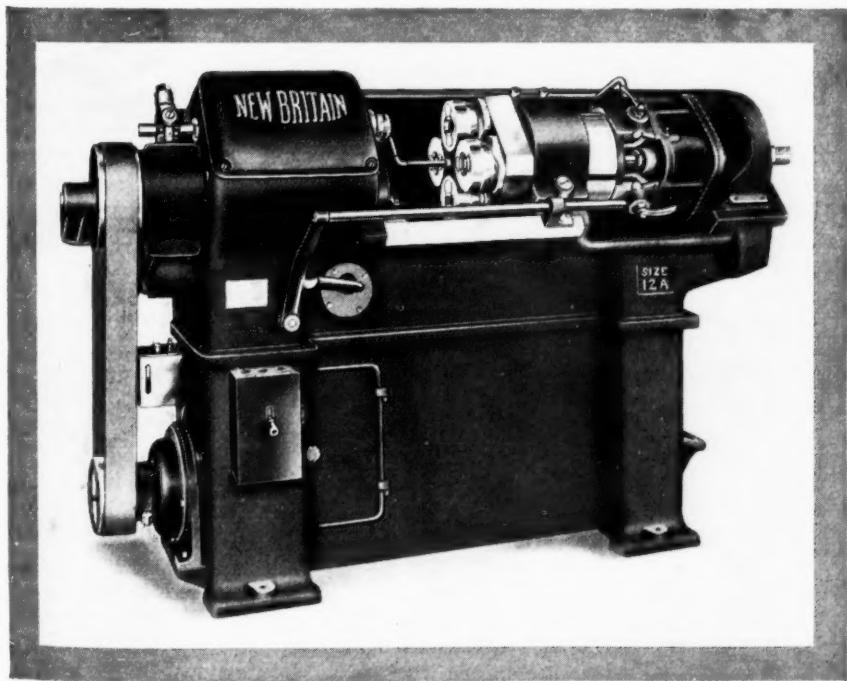


Fig. 1—Front view of new chucking machine, showing convenience of arrangement for loading and control

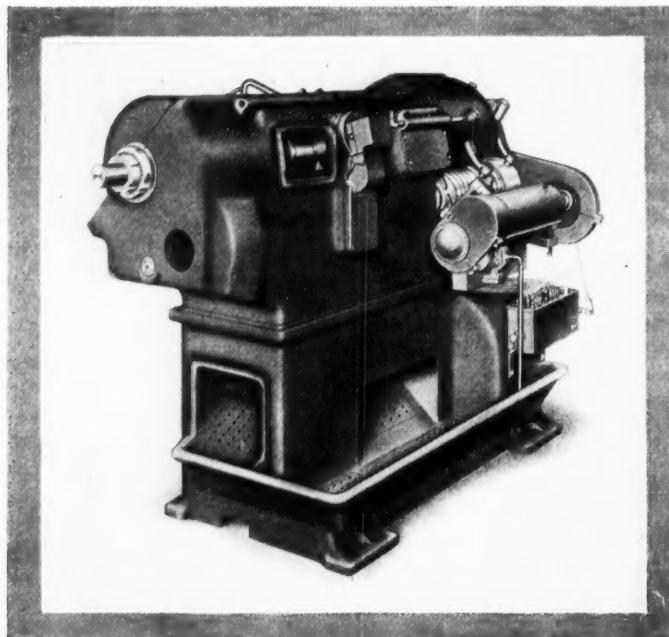


Fig. 2—Rear view, showing single camshaft, feed works assembly and pressure lubricator which is below all bearings

the lock for the work turret, the turret clamping mechanism and a Geneva stop motion for indexing the work turret. From the outer shaft at the rear the coolant pump is driven, and a pitman rod extends down to the actuating lever of a pressure feed lubricator.

As shown in Fig. 3, the work turret consists of a nest of four chucks with their pneumatic operating cylinders. The chucks are controlled by draw rods which connect with the pistons in the cylinders, each of which has a separate control valve which supplies positive pressure for clamping the work or opening the jaws. The turret is centered by the large diameter just back of the chucks and is located longitudinally by the micrometer thread at the right end. By freeing either the inner or the outer nut engaging with the thread and rotating the turret, its position can be set to 0.001 in. at any point within the range of adjustment, which is 4 in. The spider for the Geneva stop motion is shown at the right of Fig. 3. In connection with the elliptical gears which are used to speed up the turret during the indexing period, this Geneva mechanism provides a smooth acceleration and deceleration which are quite essential when the speed characteristics of the machine are considered. Air at a pressure of 80 lb. is required for the operation of the chuck cylinders.

Gears and Shafts Are Heat Treated Steel

When in the working position at each station the turret is locked by a rectangular section plunger which is tapered on one side to compensate for any slight wear. In addition to being locked in this manner, the turret is clamped by a cap shown in Fig. 1.

The draw bolt which applies the pressure on this cap in the working position is released during the indexing period by a mechanism operated from the camshaft. Therefore, rigidity during the working period is obtained and the load on the machine during the indexing period is reduced to a minimum.

All gears and shafts in the spindle head are made of alloy steel and are heat treated. For the sake of simplicity and as this is a production machine which is intended for operation on runs of some length, change gears rather than a selective gear box have been used. Cover

plates at each end of the head make the change convenient. Similar change gears are used to control the feed of the spindles. From its appearance the rigidity of the machine is readily discernible. The bed is made in one piece and extends almost two-thirds of the distance around the head and turret assemblies. Alignment is assured by mounting this one piece bed on a cabinet base which encloses the motor and forms the coolant tank.

Operative control of the machine is obtained by the rod extending across the front in conjunction with the lever valves for each spindle. The hook rod shown at the upper right can be used to open the valves as the spindles index into the loading positions, thus allowing the work to drop out so that the operator is required only to insert a new piece and throw the valve back into the clamping position. In this case the work drops down through the bed into the chute shown in Fig. 2.

The weight of this machine is 3700 lb. and the floor space requirement is 35 in. x 84 in. An electric motor which develops 3 hp. at 1800 r.p.m. is specified. Standard equipment includes four chucks of the two or three jawed type, six pairs of speed gears and four pairs of feed gears with the force feed lubricator and a motor or counter-shaft mounting, and the usual wrenches.

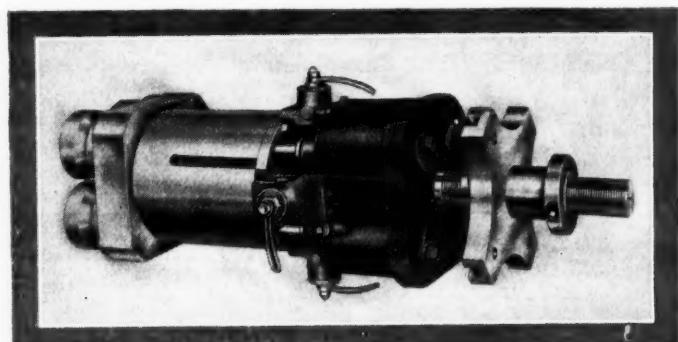


Fig. 3—Details of turret with individual control valves and spider for Geneva stop motion and micrometer adjustment

Process of Chromium Plating

A PROCESS for plating articles of base metals with chromium in an electrolytic bath has been developed by Dr. Colin G. Fink and the Chemical Treatment Co., New York City. A chromium plated surface may be either dull gray, or it may have a silver lustre or a polish claimed to be more brilliant than that of nickel. The surface, it is said, will not tarnish or corrode, hence it does not require any polishing.

That chromium might make a desirable plating material is indicated by the well-known fact that chromium steel is very hard, as well as by the fact that the addition of a relatively small proportion (about 1 per cent) of chromium renders steel stainless.

Chromium plate is being produced by the Chemical Treatment Co., Inc., under the trade name Crodon. The properties which make it valuable and determine its natural field of usefulness are its hardness, its resistance to the effects of high temperatures and its ability to take a high and durable polish. In the automobile field the process has been used for plating headlight reflectors as well as various fittings and accessories. Micrometers and dies have also been plated.

Chromium plated files are said to retain their cutting properties indefinitely where ordinary files soon become dull. Chromium plated shaft bearings are said to have resulted in savings on replacements, and such shafts might prove valuable for automobile water pumps.